

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
1. Sung VW, Hampton BS. Epidemiology of pelvic floor dysfunction. <i>Obstet Gynecol. Clin North Am.</i> 2009; 36(3):421-443.	Review/Other-Dx	N/A	To review the epidemiology of urinary incontinence, POP, anal incontinence, and painful bladder conditions.	Pelvic floor disorders are common and have a negative impact on a woman's quality of life. Unfortunately most women do not seek care for these debilitating symptoms. Understanding risk factors, particularly modifiable factors, is critical for developing future prevention guidelines and improving the specificity of treatments.	4
2. Nygaard I, Bradley C, Brandt D. Pelvic organ prolapse in older women: prevalence and risk factors. <i>Obstet Gynecol.</i> 2004; 104(3):489-497.	Review/Other-Dx	270 patients	To estimate the prevalence of POP in older women using the POP-Q examination and to identify factors associated with prolapse.	In 270 participants, age (mean +/- SD) was 68.3 +/- 5.6 years, body mass index was 30.4 +/- 6.2 kg/m(2), and vaginal parity (median [range]) was 3 (0-12). The proportions of POP-Q stages (95% CIs) were stage 0, 2.3% (95% CI, 0.8%-4.8%); stage I, 33.0% (95% CI, 27.4%-39.0%); stage II, 62.9% (95% CI, 56.8%-68.7%); and stage III, 1.9% (95% CI, 0.6%-4.3%). In 25.2% (95% CI, 20.1%-30.8%), the leading edge of prolapse was at the hymen or below. Hormone therapy was not associated with prolapse (P=.9). On multivariable analysis, less education (OR 2.16, 95% CI, 1.10-4.24) and higher vaginal parity (OR 1.61, 95% CI, 1.03-2.50) were associated with prolapse when defined as stage II or greater. For prolapse defined by the leading edge at or below the hymen, older age had a decreased risk (OR 0.50, 95% CI, 0.27-0.92) and less education, and larger babies had an increased risk (OR 2.38, 95% CI, 1.31-4.32 and OR 1.97, 95% CI, 1.07-3.64, respectively).	4

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<p>3. Maglente DD, Kelvin FM, Fitzgerald K, Hale DS, Benson JT. Association of compartment defects in pelvic floor dysfunction. <i>AJR</i>. 1999; 172(2):439-444.</p>	<p>Review/Other-Dx</p>	<p>100 patients</p>	<p>To determine the frequency of associated urinary, genital, and anorectal abnormalities in women with pelvic floor dysfunction.</p>	<p>Of the 20 patients with symptoms of anterior compartment (urinary) defect, dynamic cystoproctography revealed that 45% had vaginal vault prolapse of more than 50% and that 90% had rectoceles. Of the 45 patients with symptoms of middle compartment (genital) defect, dynamic cystoproctography revealed that 91% had cystoceles, 56% had a hypermobile bladder neck, 82% had rectoceles, 58% had enteroceles, 11% had sigmoidoceles, 20% had rectoanal intussusception, and 16% had anal incontinence. Of the 17 patients with symptoms of posterior compartment (anorectal) defect, dynamic cystoproctography showed that 71% had cystoceles, 65% had a hypermobile bladder neck, and 35% had vaginal vault prolapse of more than 50%. Of the 18 patients with symptoms of defects from a combination of compartments, dynamic cystoproctography revealed that 89% had cystoceles, 56% had a hypermobile bladder neck, 39% had vaginal vault prolapse exceeding 50%, 100% had rectoceles (of which 45% were large), 6% had enteroceles, 6% had sigmoidoceles, 22% had rectoanal intussusception, and 6% had anal incontinence.</p>	<p>4</p>

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4. Morgan DM, DeLancey JO, Guire KE, Fenner DE. Symptoms of anal incontinence and difficult defecation among women with prolapse and a matched control cohort. <i>Am J Obstet Gynecol.</i> 2007; 197(5):509 e501-506.	Observational-Dx	151 women with primary POP; 135 women without prolapse	To quantify the risk for anal incontinence and difficult defecation among women with prolapse by comparing them with women without prolapse of similar age, body mass index, race, and hysterectomy status, and to determine whether there are characteristics or findings in women with prolapse that are associated with greater symptom severity.	Incontinence of flatus was reported by 23.1% of cases vs 8.3% of control subjects (P=.006). Incontinence of liquid or solid stool was present in 4.7% and 3.5%, respectively, and was not reported by control subjects (P<.001 and .009, respectively). Difficult defecation, which was characterized by pushing on the vaginal walls to complete defecation, was present in 19.7% vs 4.4% of control subjects (P=.001). Cases that reported symptoms were compared with those that did not report symptoms. Among those reporting difficult defecation, the length of the perineal body length was greater when straining (4.0 vs 3.4 cm; P=.020). Among those reporting incontinence of flatus, mean parity was higher (3.3 vs 2.5; P=.012), and a positive standing cough stress test was more likely (39.3% vs 18.5%; P=.025). Symptoms of anal incontinence and/or difficult defecation were present in 35.3% of subjects (52/147).	3

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5. Nygaard I, Barber MD, Burgio KL, et al. Prevalence of symptomatic pelvic floor disorders in US women. <i>JAMA</i> 2008; 300(11):1311-1316.	Review/Other-Dx	1,961 nonpregnant women	To provide national prevalence estimates of symptomatic pelvic floor disorders in U.S. women.	The weighted prevalence of at least 1 pelvic floor disorder was 23.7% (95% CI, 21.2%-26.2%), with 15.7% of women (95% CI, 13.2%-18.2%) experiencing urinary incontinence, 9.0% of women (95% CI, 7.3%-10.7%) experiencing fecal incontinence, and 2.9% of women (95% CI, 2.1%-3.7%) experiencing POP. The proportion of women reporting at least 1 disorder increased incrementally with age, ranging from 9.7% (95% CI, 7.8%-11.7%) in women between ages 20 and 39 years to 49.7% (95% CI, 40.3%-59.1%) in those aged 80 years or older (P<.001), and parity (12.8% [95% CI, 9.0%-16.6%], 18.4% [95% CI, 12.9%-23.9%], 24.6% [95% CI, 19.5%-29.8%], and 32.4% [95% CI, 27.8%-37.1%] for 0, 1, 2, and 3 or more deliveries, respectively; P<.001). Overweight and obese women were more likely to report at least 1 pelvic floor disorder than normal weight women (26.3% [95% CI, 21.7%-30.9%], 30.4% [95% CI, 25.8%-35.0%], and 15.1% [95% CI, 11.6%-18.7%], respectively; P<.001). We detected no differences in prevalence by racial/ethnic group.	4
6. Gomelsky A, Penson DF, Dmochowski RR. Pelvic organ prolapse (POP) surgery: the evidence for the repairs. <i>BJU Int.</i> 2011; 107(11):1704-1719.	Review/Other-Dx	N/A	To summarize the available data on the transvaginal placement of synthetic mesh for POP repair, with a focus on the outcomes and complications of commercial POP-repair kits.	While a role exists for mesh-kit repairs, that role has not been well-defined yet. It is important to remember that mesh characteristics are unique to each product and the biocompatibility profile of a particular mesh is often based on experience with that material in other surgical applications. Judicious patient selection and detailed informed consent before these surgeries is vital. Adequate surgeon training and a solid comfort level with variations in pelvic anatomy can't be overstated. Lastly, the surgeon undertaking these procedures should be comfortable treating complications.	4

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7. Olsen AL, Smith VJ, Bergstrom JO, Colling JC, Clark AL. Epidemiology of surgically managed pelvic organ prolapse and urinary incontinence. <i>Obstet Gynecol.</i> 1997; 89(4):501-506.	Review/Other-Dx	149,554 women	To determine the incidence of surgically managed POP and urinary incontinence in a population-based cohort, and to describe their clinical characteristics.	The age-specific incidence increased with advancing age. The lifetime risk of undergoing a single operation for prolapse or incontinence by age 80 was 11.1%. Most patients were older, postmenopausal, parous, and overweight. Nearly half were current or former smokers and one-fifth had chronic lung disease. Reoperation was common (29.2% of cases), and the time intervals between repeat procedures decreased with each successive repair.	4
8. Ashok K, Petri E. Failures and complications in pelvic floor surgery. <i>World J Urol.</i> 2012; 30(4):487-494.	Review/Other-Dx	N/A	To review current literature on the failures of different surgical approaches in pelvic floor surgery, in particular the use of alloplastic materials, and to analyze complications related to them.	Use of synthetic materials in POP surgery has reduced surgical failures but it is associated with an increased risk of complications compared to traditional surgical repairs. Synthetic mid-urethral slings for SUI seem to have good success rates over long term, but they have unique complication profile including de novo development of overactive bladder, voiding dysfunction, sling exposures, dyspareunia, and long-term pain. However, some of these complications seem to be related to wrong surgical indications and improper surgical techniques, although some complications may be directly related to the use of synthetic material itself.	4
9. Nygaard I, Chai TC, Cundiff GW, et al. Summary of Research Recommendations From the Inaugural American Urogynecologic Society Research Summit. <i>Female Pelvic Med Reconstr Surg</i> 2011; 17(1):4-7.	Review/Other-Dx	N/A	To provide a summary of the research summit which was to identify research topics and directions that are critically important and immediately need to advance the field of female pelvic medicine and reconstructive surgery.	No results stated in abstract.	4

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10. Corton MM. Anatomy of pelvic floor dysfunction. <i>Obstet Gynecol. Clin North Am.</i> 2009; 36(3):401-419.	Review/Other-Dx	N/A	To provide an updated review of pelvic support anatomy with clinical correlations and to describe the surgical spaces of interest to the gynecologic surgeon and the course of the pelvic ureter.	Significant contributions made to the area of pelvic support anatomy have led to our better understanding of pelvic organ dysfunction and the role of parturition on pelvic floor injury. However, controversies remain regarding the precise anatomy and function of the pelvic connective tissue, levator ani muscles, and vaginal walls, and the specific role that defects in these structures play in the genesis of pelvic floor dysfunction. Inconsistent terminology is commonly found, and incorrect terminology is perpetuated in classic texts and publications. Efforts to clarify and standardize terminology as well as techniques to analyze the interactive role of the supporting structures in their 3-D environment should continue.	4
11. Kearney R, Sawhney R, DeLancey JO. Levator ani muscle anatomy evaluated by origin-insertion pairs. <i>Obstet Gynecol.</i> 2004; 104(1):168-173.	Review/Other-Dx	N/A	To examine the published literature and suggest a resolution to the confusion that exists in levator ani muscle descriptions and terminology.	The literature review identified 5 origin-insertion pairs consistently described in studies directly examining the levator ani muscle in women, but 16 terms were used by authors for these 5 components of the muscle. Labeled illustrations often provided more precise information than was provided in the text. Terms were reviewed for inconsistencies of usage and appropriateness of term choice. The terms puboperineal, pubovaginal, and puboanal (for components of the pubovisceral ["pubococcygeal"] muscle), along with puborectal and iliococcygeal, are sufficient to describe the divisions of the levator ani muscle.	4
12. Word RA, Pathi S, Schaffer JI. Pathophysiology of pelvic organ prolapse. <i>Obstet Gynecol. Clin North Am.</i> 2009; 36(3):521-539.	Review/Other-Dx	N/A	To review the potential mechanisms for loss of pelvic organ support in women and new insights into the role of elastic fibers in the pathophysiology of POP.	No results stated in abstract.	4

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13. Siegmann KC, Reisenauer C, Speck S, Barth S, Kraemer B, Claussen CD. Dynamic magnetic resonance imaging for assessment of minimally invasive pelvic floor reconstruction with polypropylene implant. <i>Eur J Radiol</i> 2011; 80(2):182-187.	Observational-Dx	15 patients	To assess the usefulness of dynamic MRI in patients with POP after pelvic floor repair with polypropylene mesh.	At follow-up assessment 93.3% of all patients were clinically cured. Dynamic MRI showed newly developed (n=6) or increased (n=6) POP in 80% (n=12) of all patients 3 months after pelvic floor repair. Most of them (n=11; 91.7%) affected the untreated pelvic floor compartment. On straining anatomical points of reference in the anterior pelvic floor compartment were significantly (P<0.05) elevated after anterior repair and rectal bulging was significantly (P=0.036) reduced after posterior pelvic floor repair.	2
14. Haylen BT, de Ridder D, Freeman RM, et al. An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for female pelvic floor dysfunction. <i>Int Urogynecol J.</i> 2010; 21(1):5-26.	Review/Other-Dx	N/A	To explain a consensus-based terminology report for female pelvic floor dysfunction.	A terminology report for female pelvic floor dysfunction, encompassing over 250 separate definitions, has been developed. It is clinically based with the six most common diagnoses defined. Clarity and user-friendliness have been key aims to make it interpretable by practitioners and trainees in all the different specialty groups involved in female pelvic floor dysfunction. Female-specific imaging (US, Radiology, and MRI) has been a major addition while appropriate figures have been included to supplement and help clarify the text. Ongoing review is not only anticipated but will be required to keep the document updated and as widely acceptable as possible.	4
15. Colaiacomo MC, Masselli G, Polettini E, et al. Dynamic MR imaging of the pelvic floor: a pictorial review. <i>Radiographics</i> 2009; 29(3):e35.	Review/Other-Dx	N/A	A pictorial essay to review MRI findings of POP, fecal incontinence, and obstructed defecation.	Pelvic floor dysfunctions are frequent but complex conditions that can involve some or all pelvic viscera. As abnormalities of the three pelvic compartments are frequently associated, a complete survey of the entire pelvis is necessary before surgical repair. Dynamic MRI of the pelvic floor is an excellent modality for assessing functional disorders of the pelvic floor in cases of POP, outlet obstruction, and incontinence. Findings reported at dynamic MRI of the pelvic floor are valuable for selecting candidates for surgical treatment and for indicating the most appropriate surgical approach.	4

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16. Maglinte DD, Bartram CI, Hale DA, et al. Functional imaging of the pelvic floor. <i>Radiology</i> . 2011; 258(1):23-39.	Review/Other-Dx	N/A	To describe the technique used when performing DCP, define the radiographic criteria used for diagnosis, and discuss the limitations and clinical utility of DCP.	No results stated in abstract.	4
17. Burrows LJ, Sewell C, Leffler KS, Cundiff GW. The accuracy of clinical evaluation of posterior vaginal wall defects. <i>Int Urogynecol J. Pelvic Floor Dysfunct</i> . 2003; 14(3):160-163; discussion 163.	Observational-Dx	106 cases	To define the accuracy of the physical examination for detecting the site of the rectovaginal fascia defect in women with a rectocele.	Clinical and surgical findings were compared using the chi2 test. Logistic regression analysis was used to identify predictive variables. Clinical examination concurred with surgical findings in 59.4% (63/106) and differed in 40.6% (43/106). Predictors of agreement between clinical examination and intraoperative findings were the presence of multiple defects in the rectovaginal fascia at surgery (OR 4.42, 95% CI, 1.89, 10.35) and stage II or III prolapse (OR 0.0007, 95% CI, 0.00059, 0.003 and 0.0003, 95% CI, 0.00033, 0.0017, respectively). The sensitivity and PPV for all defects was less than 40%.	3
18. Gupta S, Sharma JB, Hari S, Kumar S, Roy KK, Singh N. Study of dynamic magnetic resonance imaging in diagnosis of pelvic organ prolapse. <i>Arch Gynecol Obstet</i> 2012; 286(4):953-958.	Observational-Dx	28 patients	To define the role of MRI in POP.	28 subjects with grade III and 2 subjects with grade IV prolapse were enrolled. The mean age was 52.8 and the mean parity was 3.63. On MRI, 19 patients were found to have grade III prolapse, 4 had grade IV prolapse and the rest had grade I and II prolapse. There was poor agreement of MRI with clinical examination in anterior and middle compartments (k 0.161, k 0.144). The agreement between MRI and intra-operative findings was 0.369, 0.422 for anterior and posterior compartments. Kappa was 0.085 for rectocele and 0.710 for enteroceles. The agreement was better for posterior compartment and enterocele. MRI detected 5/8 enteroceles intra-operatively.	2

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19. Altringer WE, Saclarides TJ, Dominguez JM, Brubaker LT, Smith CS. Four-contrast defecography: pelvic "floor-oscscopy". <i>Dis Colon Rectum</i> . 1995; 38(7):695-699.	Observational-Dx	62 women	To determine the accuracy of physical examination (as judged by four-contrast defecography) for women with pelvic floor relaxation disorders.	Four-contrast defecography changed the diagnosis in 46 patients (75%); 26% of presumed cystoceles, 36% of enteroceles, and 25% of rectoceles were not present on defecography. Defecography also revealed unsuspected coexisting defects in addition to known abnormalities detected on physical examination. In contrast, when physical examination was negative for these defects, 63% of patients were found to have cystoceles, 46% to have enteroceles, and 73% to have rectoceles on four-contrast defecography. The discovery of Grade 2 or 3 unsuspected abnormalities was significant, especially so for enteroceles. For posterior vaginal eversions extending to or past the introitus, physical examination was accurate in only 61%. Physical examination of large anterior defects was more accurate, with 74% of patients being correctly diagnosed.	3
20. Kaufman HS, Buller JL, Thompson JR, et al. Dynamic pelvic magnetic resonance imaging and cystocolpoproctography alter surgical management of pelvic floor disorders. <i>Dis Colon Rectum</i> . 2001; 44(11):1575-1583; discussion 1583-1574.	Review/Other-Dx	22 patients	To evaluate dynamic pelvic MRI and DCP in the surgical management of females with complex pelvic floor disorders.	The mean age of the study group was 58 +/- 13 years, and all patients were Caucasian. Constipation (95.5%), urinary incontinence (77.3%), complaints of incomplete fecal evacuation (59.1%), and bulging vaginal tissues (54.4%) were the most common complaints on presentation. All patients had multiple complaints with a median number of 4 symptoms (range, 2-8). Physical examination, dynamic MRI, and DCP were concordant for rectocele, enterocele, cystocele, and perineal descent in only 41% of patients. Dynamic imaging lead to changes in the initial operative plan in 41% of patients. Dynamic MR was the only modality that identified levator ani hernias. DCP identified sigmoidoceles and internal rectal prolapse more often than physical examination or dynamic MR.	4

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21. Dietz HP, Steensma AB. Posterior compartment prolapse on two-dimensional and three-dimensional pelvic floor ultrasound: the distinction between true rectocele, perineal hypermobility and enterocele. <i>Ultrasound Obstet Gynecol.</i> 2005; 26(1):73-77.	Review/Other-Dx	198 women	To determine the prevalence of these conditions in a urogynecological population.	Clinically, a rectocele was diagnosed in 112 (56%) cases. Rectovaginal septal defects were observed sonographically in 78 (39%) women. There was a highly significant relationship between US and clinical grading (P<0.001). Of 112 clinical rectoceles, 63 (56%) cases showed a fascial defect, 8 (7%) showed perineal hypermobility without fascial defect, and in 3 (3%) cases there was an isolated enterocele. In 38 (34%) cases, no sonographic abnormality was detected. Neither position of the ampulla nor presence, width or depth of defects correlated with vaginal parity. In contrast, age showed a weak association with rectal descent (r = -0.212, P=0.003), the presence of fascial defects (P=0.002) and their depth (P=0.02).	4
22. Kelvin FM, Hale DS, Maglente DD, Patten BJ, Benson JT. Female pelvic organ prolapse: diagnostic contribution of dynamic cystoproctography and comparison with physical examination. <i>AJR.</i> 1999; 173(1):31-37.	Observational-Dx	170 consecutive patients	To assess the contribution of dynamic cystoproctography to the evaluation of female POP and to compare this contribution with that of physical examination.	A rectocele was detected by proctography in 155 patients (91%); 119 (77%) of these rectoceles were also found on physical examination. Barium trapping at proctography was related to rectocele size. Proctography showed an enterocele in 47 patients (28%); 24 (51%) of these enteroceles were also found on physical examination. Physical examination also found 44 enteroceles that could not be corroborated radiologically. At proctography, the enteroceles were relatively large, extending an average of 7.3 cm below the vaginal apex. 8 patients had sigmoidoceles, none of which were found on physical examination. A cystocele was shown by cystoproctography in 159 patients (94%); 132 (83%) of these cystoceles were also found on physical examination.	3

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23. Comiter CV, Vasavada SP, Barbaric ZL, Gousse AE, Raz S. Grading pelvic prolapse and pelvic floor relaxation using dynamic magnetic resonance imaging. <i>Urology</i> 1999; 54(3):454-457.	Observational-Dx	164 patients	To describe a simple and objective grading system for describing, quantifying, and staging POP and pelvic floor relaxation using dynamic MRI.	The image acquisition time was 2.5 minutes per study. Each study cost \$540. In the pain group, the H-line averaged 5.2 +/- 1.1 cm vs 7.5 +/- 1.5 cm in the prolapse group (P<0.001). The M-line averaged 1.9 +/- 1.2 cm in the pain group vs 4.1 +/- 1.5 cm in the prolapse group (P<0.001). Incidental pelvic pathologic features were commonly noted, including uterine fibroids, ovarian cysts, hydroureter, urethral diverticula, and foreign body.	3
24. Lienemann A, Anthuber C, Baron A, Kohz P, Reiser M. Dynamic MR colpocystorectography assessing pelvic-floor descent. <i>Eur Radiol.</i> 1997; 7(8):1309-1317.	Observational-Dx	5 healthy volunteers and 44 female patients	To combine dynamic MRI and adequate opacification to better delineate the pelvic-floor anatomy and to visualize the extent of descensus and prolapse. To compare this technique to dynamic fluoroscopy using the clinical evaluation and the intraoperative results as reference.	The clinical evaluation and the intraoperative results (30 cases) were used as reference. MR-colpocystorectography and dynamic fluoroscopy were nondiagnostic in 3 cases each. Most patients had a combined type of visceral prolapse, the most frequent combination being a vaginal vault prolapse and a cystocele. The points of reference were sufficiently outlined by dynamic fluoroscopy and MR-colpocystorectography. In comparison with the clinical and intraoperative results, MR-colpocystorectography proved to be especially beneficial in the diagnosis of different types of enteroceles including a uterovaginal prolapse. MR-colpocystorectography showed an equal or higher sensitivity and specificity for all individual sites when compared with dynamic fluoroscopy. Also, predominant herniation obscuring other concomitant prolapse could be verified in 8 cases. MR-colpocystorectography is superior to dynamic fluoroscopy and accurately depicts pelvic-floor descent and prolapse in women.	2
25. Kelvin FM, Maglinte DD. Dynamic cystoproctography of female pelvic floor defects and their interrelationships. <i>AJR.</i> 1997; 169(3):769-774.	Review/Other-Dx	N/A	A pictorial essay to illustrate clinically significant aspects of female pelvic floor defects as shown by dynamic cystoproctography and to explain how pelvic organ interrelationships necessitate modification of this technique.	No results stated in abstract.	4

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26. Maglinte DD, Hale DS, Sandrasegaran K. Comparison between dynamic cystocolpoproctography and dynamic pelvic floor MRI: pros and cons: Which is the "functional" examination for anorectal and pelvic floor dysfunction? <i>Abdom Imaging</i> . 2013;38(5):952-973.	Review/Other-Dx	N/A	A review to analyze the pros and cons between DCP and dynamic pelvic floor MRI, addresses imaging and interpretive controversies, and their relevance to clinical management.	Rectal emptying performed with DCP provides the maximum stress to the pelvic floor resulting in complete levator ani relaxation. In addition to diagnosing defecatory disorders, this method of examination demonstrates maximum pelvic organ descent and provides organ-specific quantification of organ prolapse, information that is only inferred by means of physical examination. It has been found to be of clinical value in patients with defecation disorders and the diagnosis of associated prolapse in other compartments that are frequently unrecognized by history taking and the limitations of physical examination. Pelvic floor anatomy is complex and DCP does not show the anatomical details pelvic MRI provides. Technical advances allowing acquisition of dynamic rapid MRI sequences has been applied to pelvic floor imaging. Early reports have shown that pelvic MRI may be a useful tool in pre-operative planning of these disorders and may lead to a change in surgical therapy. Predictions of hypothetical increase cancer incidence and deaths in patients exposed to radiation, the emergence of pelvic floor MRI in addition to questions relating to the clinical significance of DCP findings have added to these controversies.	4
27. Bertschinger KM, Hetzer FH, Roos JE, Treiber K, Marincek B, Hilfiker PR. Dynamic MR imaging of the pelvic floor performed with patient sitting in an open-magnet unit versus with patient supine in a closed-magnet unit. <i>Radiology</i> . 2002; 223(2):501-508.	Observational-Dx	38 patients	To compare open-magnet MRI performed with the patient sitting with dynamic closed-magnet MRI of the pelvic floor performed with the patient supine.	All intussusceptions were missed at supine MRI. With sitting MRI as the reference standard, the sensitivity of supine MRI was 79% for depiction of bladder descents. When MR findings were graded and clinically irrelevant MR findings were excluded, sensitivity increased to 100% for depiction of bladder descents and anterior rectoceles and to 96% for depiction of rectal descents.	2

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28. Pannu HK, Scatarige JC, Eng J. Comparison of supine magnetic resonance imaging with and without rectal contrast to fluoroscopic cystocolpoproctography for the diagnosis of pelvic organ prolapse. <i>J Comput Assist Tomogr</i> 2009; 33(1):125-130.	Observational-Dx	82 patients	To compare supine MRI, with and without rectal contrast, with fluoroscopic CCP for the diagnosis of POP.	For the entire patient group, the prevalence of cystoceles was 89% on CCP and 80% on MRI; vaginal prolapse was 81% on CCP and 56% on MRI; enteroceles, 38% on CCP and 24% on MRI; and anterior rectoceles, 45% on CCP and 37% on MRI. There were significantly more cystoceles (OR 4.7, P=0.003), vaginal prolapses (OR 5.2, P<0.0005), and enteroceles (OR 3.8, P<0.0005) on CCP than on MRI. For MRI with rectal contrast vs CCP, the prevalence of cystoceles was 94% on CCP and 91% on MRI; vaginal prolapse, 74% on CCP and 70% on MRI; enteroceles, 36% on CCP and 19% on MRI; and anterior rectoceles, 51% on CCP and 59% on MRI. There was statistical significance only for enteroceles, more of which were found on CCP (OR 7.4, P=0.003). For MRI without rectal contrast vs CCP, the prevalence of cystoceles was 85% on CCP and 72% on MRI; vaginal prolapse, 86% on CCP and 46% on MRI; enteroceles, 40% on CCP and 28% on MRI; and anterior rectoceles, 39% on CCP and 21% on MRI. There were significantly more cystoceles (OR 6.6, P=0.003), vaginal prolapses (OR 20.8, P<0.0005), enteroceles (OR 2.9, P=0.015), and rectoceles (OR 4.9, P=0.001) on CCP than on noncontrast MRI.	3

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29. Flusberg M, Sahni VA, Erturk SM, Mortelet KJ. Dynamic MR defecography: assessment of the usefulness of the defecation phase. <i>AJR</i> . 2011; 196(4):W394-399.	Observational-Dx	83 patients	To assess the usefulness of the defecation phase during dynamic MR defecography.	Compared with images obtained in the other phases, defecation phase images helped in identification of additional cases of abnormal bladder descent in 43 examinations (50.6%), abnormal vaginal descent in 52 examinations (61.2%), and abnormal rectal descent in 11 examinations (12.9%). Similarly, only defecation phase images depicted previously undetected rectoceles 2 cm or larger in 31 examinations (36.5%), enteroceles in 34 examinations (40%), and intussusceptions in 22 examinations (25.9%). The number of additional cases of abnormalities identified on defecation phase images was significantly greater than the number identified on images obtained in the other phases (P<0.005). The average total scores for the rest, squeeze, strain, and defecation phases were 1.4, 0.7, 2.3, and 6.6. The average total defecation phase score was significantly greater than the average total score in any of the other phases (P<0.001).	3
30. Gufler H, Ohde A, Grau G, Grossmann A. Colpocystoproctography in the upright and supine positions correlated with dynamic MRI of the pelvic floor. <i>Eur J Radiol</i> 2004; 51(1):41-47.	Observational-Dx	7 patients	To test whether there are statistically significant differences between measurement results on colpocystoproctography in the upright and the supine positions, and to correlate these results with dynamic MRI.	At pelvic strain, bladder neck position, angle of urethral inclination, posterior vesicourethral angle and vaginal vault position measurements showed no statistically significant differences between colpocystoproctography in the upright and supine positions or dynamic MRI. For the bladder neck height at pelvic floor relaxation, significant differences were found between colpocystoproctography in the upright and supine positions, and colpocystoproctography in the upright position vs dynamic MRI.	3
31. Tumbarello JA, Hsu Y, Lewicky-Gaupp C, Rohrer S, DeLancey JO. Do repetitive Valsalva maneuvers change maximum prolapse on dynamic MRI? <i>Int Urogynecol J</i> . 2010; 21(10):1247-1251.	Review/Other-Dx	40 patients	To quantify differences in anterior vaginal wall prolapse during sequential Valsalva attempts on dynamic MRI.	40% of women had a >2 cm increase in prolapse size from their first to third Valsalva attempt. 95% of women extended their prolapse further with a third Valsalva.	4
32. Dietz HP. Pelvic floor ultrasound: a review. <i>Am J Obstet Gynecol</i> . 2010; 202(4):321-334.	Review/Other-Dx	N/A	To give an overview of US and its main current uses in clinical assessment and research.	No results stated in abstract.	4

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
33. Perniola G, Shek C, Chong CC, Chew S, Cartmill J, Dietz HP. Defecation proctography and translabial ultrasound in the investigation of defecatory disorders. <i>Ultrasound Obstet Gynecol.</i> 2008; 31(5):567-571.	Observational-Dx	31 women	A comparative clinical study to determine agreement between defecation proctography and translabial US.	6 women did not attend defecation proctography, leaving 31 cases for comparison. The mean age was 53 years. Patients rated discomfort at a median of 1 (range 0-10) for US and 7 (range 0-10) for defecation proctography (P<0.001). Defecation proctography suggested rectocele and rectal intussusception/prolapse more frequently than did US. While the PPV of US (considering defecation proctography to be the definitive test) was 0.82 for rectocele and 0.88 for intussusception/prolapse, NPVs were only 0.43 and 0.27, respectively. Cohen's kappa values were 0.26 and 0.09, respectively. There was poor agreement between US and defecation proctography measurements of anorectal angle and rectocele depth.	2
34. Santoro GA, Wiczorek AP, Dietz HP, et al. State of the art: an integrated approach to pelvic floor ultrasonography. <i>Ultrasound Obstet Gynecol.</i> 2011; 37(4):381-396.	Review/Other-Dx	N/A	To present the different US techniques (transvaginal US, EAUS and transperineal US) for pelvic floor imaging, and to discuss how these modalities may be combined to achieve a complete anatomical evaluation of this region.	No results stated in abstract.	4
35. Steensma AB, Oom DM, Burger CW, Schouten WR. Assessment of posterior compartment prolapse: a comparison of evacuation proctography and 3D transperineal ultrasound. <i>Colorectal Dis.</i> 2010; 12(6):533-539.	Observational-Dx	75 patients	To compare evacuation proctography with 3-D transperineal US in diagnosing posterior compartment prolapse.	Between 2005 and 2007, 75 patients were included with a median age of 59 years (range 22-83). The Cohen's Kappa Index for enterocele was 0.65 (good) and for rectocele it was 0.55 (moderate). The level of correlation for intussusception was fair (kappa = 0.21).	2

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
36. Regadas FS, Haas EM, Abbas MA, et al. Prospective multicenter trial comparing echodefecography with defecography in the assessment of anorectal dysfunction in patients with obstructed defecation. <i>Dis Colon Rectum</i> . 2011; 54(6):686-692.	Observational-Dx	86 women	To validate the effectiveness of echodefecography compared with defecography in the assessment of anorectal dysfunctions related to obstructed defecation.	86 women were evaluated: median Wexner constipation score, 13.4 (range, 6-23); median age, 53.4 (range, 26-77) years. Rectocele was identified with substantial agreement between the 2 methods (defecography, 80 patients; echodefecography, 76 patients; kappa = 0.61; 95% CI, 0.48-0.73). The 2 techniques demonstrated identical findings in 6 patients without rectocele, and in 9 patients with grade I, 29 with grade II, and 19 patients with grade III rectoceles. Defecography identified rectal intussusception in 42 patients, with echodefecography identifying 37 of these cases, plus 4 additional cases, yielding substantial agreement (kappa = 0.79; 95% CI, 0.57-1.0). Intussusception was associated with rectocele in 28 patients for both methods (kappa = 0.62; 95% CI, 0.41-0.83). There was substantial agreement for anismus (kappa = 0.61; 95% CI, 0.40-0.81) and for rectocele combined with anismus (kappa = 0.61; 95% CI, 0.40-0.82). Agreement for grade III enterocele was classified as almost perfect (kappa = 0.87; 95% CI, 0.66-1.0).	2
37. Dalpiaz O, Curti P. Role of perineal ultrasound in the evaluation of urinary stress incontinence and pelvic organ prolapse: a systematic review. <i>Neurourol Urodyn</i> 2006; 25(4):301-306; discussion 307.	Review/Other-Dx	N/A	A review of the international literature on urogynecology to focus on the actual role of perineal US.	US has become an indispensable diagnostic procedure in urogynecology. Perineal, introital, and EAUS are the most recommended techniques and the results comprise qualitative and quantitative findings. These are important for determining the localization of the bladder neck and vesico-urethral junction and also for pre- and postoperative comparisons, and moreover for clinical applications and scientific investigations.	4

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
38. Singh K, Reid WM, Berger LA. Assessment and grading of pelvic organ prolapse by use of dynamic magnetic resonance imaging. <i>Am J Obstet Gynecol.</i> 2001; 185(1):71-77.	Review/Other-Dx	20 patients	To assess and compare a new technique of grading POP by using dynamic MRI with the clinical staging proposed by the International Continence Society.	The proposed staging by MRI showed good correlation with the clinical staging (kappa = 0.61). MRI improved clinical assessment by its ability to measure the actual pelvic organ descent and to delineate prolapse of the pouch of Douglas accurately. The MPL was a useful reference line for grading prolapse on MRI. The levator-vaginal angle and the area of the genital hiatus are useful in assessing vaginal support at different anatomic levels.	4
39. Yang A, Mostwin JL, Rosenshein NB, Zerhouni EA. Pelvic floor descent in women: dynamic evaluation with fast MR imaging and cinematic display. <i>Radiology.</i> 1991; 179(1):25-33.	Review/Other-Dx	26 women; 16 control subjects	To assess pelvic prolapse with dynamic fast MRI.	26 women with signs and symptoms suggesting pelvic prolapse and 16 control subjects were studied with a series of fast (6-12-second) MRIs. Sagittal and coronal images were obtained with graded increase in voluntary pelvic strain, allowing for dynamic display and quantification of the pelvic prolapse process. The distance from the PCL was used as an internal reference for measurement of descent in the maximal strain position. With use of control results for normal limit values, prolapse involving the anterior pelvic compartment (cystocele), the middle compartment (vaginal prolapse, uterine prolapse, and enterocele), and the posterior compartment (rectocele) was easily demonstrated. Significant differences between control subjects and patients with prolapse were seen at maximal strain but not in the relaxed state. Quantification of the pelvic descent process with use of fast MRI may be of value in surgical planning and postsurgical follow-up.	4
40. Bump RC, Mattiasson A, Bo K, et al. The standardization of terminology of female pelvic organ prolapse and pelvic floor dysfunction. <i>Am J Obstet Gynecol.</i> 1996; 175(1):10-17.	Review/Other-Dx	N/A	To present a standard system of terminology recently approved by the International Continence Society, the American Urogynecologic Society, and the Society of Gynecologic Surgeons for the description of female POP and pelvic floor dysfunction.	No results stated in abstract.	4

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
41. Kluivers KB, Hendriks JC, Shek C, Dietz HP. Pelvic organ prolapse symptoms in relation to POPQ, ordinal stages and ultrasound prolapse assessment. <i>Int Urogynecol J. Pelvic Floor Dysfunct.</i> 2008; 19(9):1299-1302.	Observational-Dx	265 women	To evaluate the probability of prolapse symptoms with increasing degree of prolapse as assessed by three staging systems.	265 consecutive women were evaluated. The area under the receiver operating characteristics curve for the three staging systems ranged from 0.715 to 0.783. POP-Q staging and ordinal staging performed equally well in the prediction of prolapse symptoms (P=0.780), and both performed better as compared with US prolapse assessment (P=0.048 and P=0.015, respectively). Prolapse staging can equally be performed by the POP-Q and ordinal stages systems as far as the discrimination between women with and without prolapse symptoms is concerned. The US prolapse assessment does not perform better as compared with these two systems.	3
42. Broekhuis SR, Kluivers KB, Hendriks JC, Vierhout ME, Barentsz JO, Futterer JJ. Dynamic magnetic resonance imaging: reliability of anatomical landmarks and reference lines used to assess pelvic organ prolapse. <i>Int Urogynecol J. Pelvic Floor Dysfunct.</i> 2009; 20(2):141-148.	Observational-Dx	30 patients	To determine the intra- and interobserver reliability of dynamic MRI staging in POP patients.	In 30 patients with POP, dynamic MRIs were assessed independently by 2 observers. Various anatomical landmarks to assess POP were used in relation to the PCL, H-line, and mid-pubic line. Clinical measurement points were assessed in relation to the mid-pubic line. The ICCs were calculated to describe the intra- and interobserver reliability. Overall, the intra- and interobserver reliability of MRI measurements was excellent to good. The PCL showed superior reliability (ICC range 0.70-0.99). The reliability of clinical measurement points, however, were only moderate (ICC range 0.20-0.96). The intra- and interobserver reliability of quantitative prolapse staging on dynamic MRI were good to excellent. The PCL appears the most reliable to use.	3

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
43. Cortes E, Reid WM, Singh K, Berger L. Clinical examination and dynamic magnetic resonance imaging in vaginal vault prolapse. <i>Obstet Gynecol.</i> 2004; 103(1):41-46.	Observational-Dx	51 women	To estimate the role of dynamic MRI as a diagnostic tool in the evaluation of vaginal apex prolapse in women with previous hysterectomy.	Analysis of each compartment separately revealed poor correlation between clinical and MRI assessment. Of the 51 cases with clinical vault prolapse, 27 (52.9%) cases were clinically overdiagnosed, 3 (6%) were underdiagnosed, and there was agreement in 21 (41.1%) when compared with MRI findings. Postoperative follow-up of the 18 (85%) patients who underwent colposacropexy after intraoperative assessment revealed the presence of cystocele in 4 (26.6%) occasions and rectocele in 3 (20%), which had been detected on MRI but not confirmed intraoperatively.	2
44. Fauconnier A, Zareski E, Abichedid J, Bader G, Falissard B, Fritel X. Dynamic magnetic resonance imaging for grading pelvic organ prolapse according to the International Continence Society classification: which line should be used? <i>Neurourol Urodyn</i> 2008; 27(3):191-197.	Observational-Dx	47 patients	To assess and compare the reliability of dynamic MRI to quantify POP according to the International Continence Society (ICS) using two different reference lines, and to determine which line gives the best concordance with clinical examination.	The intra-observer and inter-observer reliability of MRI measurements were in general excellent. Intra-class coefficients were better for the mid-pubic line than the perineal line. Although the MRI measurements correlate significantly with the physical measurements, the Altman and Bland plot shows an unacceptable magnitude of discrepancy between clinical and MRI examinations.	3
45. Lienemann A, Sprenger D, Janssen U, Grosch E, Pellengahr C, Anthuber C. Assessment of pelvic organ descent by use of functional cine-MRI: which reference line should be used? <i>Neurourol Urodyn</i> 2004; 23(1):33-37.	Review/Other-Dx	41 patients	To find out which of three reference lines on functional cine-MRI correlates best with the respective clinical diagnoses.	The volunteers either showed a stage 0 (16 cases), stage I (12 cases), or a stage II (13 cases) organ descent on clinical examination with 10 women (24.4%) having a pathological ICS-score in the anterior, 15 women (36.1%) in the superior, and 4 women (9.8%) in the posterior compartment. On functional MRI the best correlation with the clinical results was achieved using the PCL for the anterior compartment (22.0%), the PCL with an offset of + 3 cm for the superior (36.6%), and the hymenal line for the posterior compartment (9.8%).	4

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
46. Pannu HK, Scatarige JC, Eng J. MRI diagnosis of pelvic organ prolapse compared with clinical examination. <i>Acad Radiol</i> 2011; 18(10):1245-1251.	Observational-Dx	88 women	To determine agreement between clinical examination and MRI (rectal contrast and noncontrast MRI) for POP using both the PCL and the MPL and to assess the relationship between measurements performed relative to each line.	Agreement of rectal contrast MRI with clinical exam was 79% for PCL and 85% for MPL (P=.17) for cystoceles, 50% for PCL and 59% for MPL (P=.20) for vaginal prolapse, 56% for PCL for enteroceles, and 61% for rectoceles. Agreement of noncontrast MRI with clinical exam was 67% for PCL and 78% for MPL (P=.19) for cystoceles, 58% for PCL and 71% for MPL (P=.10) for vaginal prolapse, 65% for enteroceles, and 40% for rectoceles. The average difference between the PCL and the MPL was 3.12 +/- 0.24 cm at the bladder base and 4.88 +/- 0.37 cm at the vaginal apex.	3
47. Woodfield CA, Hampton BS, Sung V, Brody JM. Magnetic resonance imaging of pelvic organ prolapse: comparing pubococcygeal and midpubic lines with clinical staging. <i>Int Urogynecol J. Pelvic Floor Dysfunct.</i> 2009; 20(6):695-701.	Observational-Dx	20 women	To determine which MRI reference line for staging POP, the PCL vs the MPL, has the highest agreement with clinical staging.	20 women were included. Agreement between clinical and PCL staging was fair in the anterior (kappa = 0.29) and poor in the apical (kappa = 0.03) and posterior (kappa = 0.08) compartments. Agreement between clinical and MPL staging was fair in the anterior (kappa = 0.37), apical (kappa = 0.31), and posterior (kappa = 0.25) compartments.	2
48. Pham T, Burgart A, Kenton K, Mueller ER, Brubaker L. Current Use of Pelvic Organ Prolapse Quantification by AUGS and ICS Members. <i>Female Pelvic Med Reconstr Surg</i> 2011; 17(2):67-69.	Review/Other-Dx	308 patients	To determine the current use of the POP-Q by members of the American Urogynecologic Society (AUGS) and the ICS.	The 308 respondents had a median of 8 years (range, 0-35 years) of independent performance of POP surgery. Most were from the United States (70%), in a shared practice (64%), with at least 2 years of fellowship training (61%), and had trainees participating in patient care (81%). Of the respondents, 76% reported using the POP-Q; however, the technique of POP-Q varied. Of the 24% not using the POP-Q, two-thirds reported past POP-Q use. For these individuals, prolapse description was done using Baden-Walker (57%), descriptive words (38%), or other grades (7%). More than 50% of nonusers reported that the POP-Q is "too time-consuming" or that their "colleagues do not use it."	4

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
49. Lockhart ME, Fielding JR, Richter HE, et al. Reproducibility of dynamic MR imaging pelvic measurements: a multi-institutional study. <i>Radiology</i> . 2008; 249(2):534-540.	Observational-Dx	198 patients	To assess the reproducibility of bone and soft-tissue pelvimetry measurements obtained from dynamic MRI studies in primiparous women across multiple centers.	There was acceptable agreement (ICC range, 0.71-0.93) for 8 of 19 MRI parameters at initial readings of 198 subjects. The remaining parameters had an ICC range of 0.13-0.66. Additional training reduced measurement variability: 12 of 19 parameters had acceptable agreement (ICC range, 0.70-0.92). Correlations were greater for bone (ICC, ≥ 0.70 in 5 [initial readings] and 8 of 9 [rereadings] variables) than for soft-tissue measurements (ICC, ≥ 0.70 in 3 [initial readings] of 10 and 4 [rereadings] of 10 readings, respectively).	3
50. Visco AG, Wei JT, McClure LA, Handa VL, Nygaard IE. Effects of examination technique modifications on pelvic organ prolapse quantification (POP-Q) results. <i>Int Urogynecol J. Pelvic Floor Dysfunct</i> . 2003; 14(2):136-140.	Review/Other-Dx	133 patients	To ensure that anatomic outcomes can be optimally assessed, investigators in the Pelvic Floor Disorders Network evaluated the impact of specific technique variations on POP-Q measurements.	No results stated in abstract.	4
51. Agur W, Housami F, Drake M, Abrams P. Could the National Institute for Health and Clinical Excellence guidelines on urodynamics in urinary incontinence put some women at risk of a bad outcome from stress incontinence surgery? <i>BJU Int</i> . 2009; 103(5):635-639.	Observational-Dx	6,276 patients	To evaluate the potential impact of the UK National Institute for Health and Clinical Excellence (NICE) recommendation that preoperative urodynamics are not necessary for women with 'pure symptoms of SUI', by using data from a population of women referred with lower urinary tract symptoms.	Only 324 (5.2%) women had pure SUI; moreover, a quarter of those with pure SUI symptoms ultimately had urodynamic diagnoses other than urodynamic SUI that could affect the outcome of continence surgery.	4

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
52. Nager CW, Brubaker L, Litman HJ, et al. A randomized trial of urodynamic testing before stress-incontinence surgery. <i>N Engl J Med</i> 2012; 366(21):1987-1997.	Experimental-Tx	630 women	A multicenter, randomized, noninferiority trial involving women with uncomplicated, demonstrable SUI to compare outcomes after preoperative office evaluation and urodynamic tests or evaluation only.	A total of 630 women were randomly assigned to undergo office evaluation with urodynamic tests or evaluation only (315 per group); the proportion in whom treatment was successful was 76.9% in the urodynamic-testing group vs 77.2% in the evaluation-only group (difference, -0.3% age points; 95% CI, -7.5 to 6.9), which was consistent with noninferiority. There were no significant between-group differences in secondary measures of incontinence severity, quality of life, patient satisfaction, rates of positive provocative stress tests, voiding dysfunction, or adverse events. Women who underwent urodynamic tests were significantly less likely to receive a diagnosis of overactive bladder and more likely to receive a diagnosis of voiding-phase dysfunction, but these changes did not lead to significant between-group differences in treatment selection or outcomes.	1
53. Chantarasorn V, Dietz HP. Diagnosis of cystocele type by clinical examination and pelvic floor ultrasound. <i>Ultrasound Obstet Gynecol.</i> 2012; 39(6):710-714.	Observational-Dx	94 patients	To use the ICS POP-Q examination to distinguish between two types of cystocele and compare findings with pelvic floor US results.	The agreement between two observers for the clinical diagnosis of cystocele types was moderate (kappa = 0.561 and 0.544, P<0.0001). Clinical diagnosis showed moderate to good agreement with US findings for both observers (kappa between 0.318 and 0.794, P<0.001).	3

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
54. Lukacz ES, DuHamel E, Menefee SA, Luber KM. Elevated postvoid residual in women with pelvic floor disorders: prevalence and associated risk factors. <i>Int Urogynecol J. Pelvic Floor Dysfunct.</i> 2007; 18(4):397-400.	Review/Other-Dx	1,399 women	To assess risks for elevated post void residual in women with pelvic floor disorders.	The 1,399 women underwent evaluation including standardized questionnaire, examination, and catheterized post void residual. Elevated post void residual was defined as ≥ 100 ml and anterior and apical prolapse was defined as at or beyond the hymen. Overall, the prevalence of elevated post void residual was 11%. After matching, the absence of stress incontinence symptoms (OR 0.55, CI 0.33-0.92), the symptoms of vaginal bulge (OR 2.19, CI 1.38-3.48), pelvic pressure (OR 1.79, CI 1.14-2.86), urinary splinting (OR 2.89, CI 1.24-6.74), and presence of prolapse (OR 2.60 CI 1.62-4.18) were significantly associated with an elevated post void residual. Only prolapse (OR 1.96 CI 1.37-2.79) maintained a significant association after multivariate analysis.	4
55. Tunn R, Petri E. Introital and transvaginal ultrasound as the main tool in the assessment of urogenital and pelvic floor dysfunction: an imaging panel and practical approach. <i>Ultrasound Obstet Gynecol.</i> 2003; 22(2):205-213.	Review/Other-Dx	N/A	To review the different applications of US in benign urogynecological diseases.	No results stated in abstract.	4

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
56. Foster RT, Amundsen CL, Webster GD. The utility of magnetic resonance imaging for diagnosis and surgical planning before transvaginal periurethral diverticulectomy in women. <i>Int Urogynecol J. Pelvic Floor Dysfunct.</i> 2007; 18(3):315-319.	Review/Other-Dx	27 women	To report the value of MRI in the evaluation of urethral diverticulum in women.	The cohort presented with a variety of symptoms. The mean time from onset of symptoms to diagnosis of a urethral diverticulum was 47 months. 7 (26%) women had a history of one or more prior diverticulectomies, and 8 (30%) had prior incontinence or other urethral surgery. 21 (78%) had undergone a preoperative MRI, which detected the diverticulum in all cases. In 3 women, multiple other prior imaging studies had failed to identify the diverticulum despite clinical suspicion of its presence. MRI revealed an unsuspected intradiverticular carcinoma in one patient. 26 women were treated with periurethral diverticulectomy, and one patient was treated with cystourethrectomy. Average follow-up was 9 (range 1-60) months. No patients had significant intraoperative complications. One patient was diagnosed (by MRI) with a recurrent diverticulum. The use of preoperative MRI altered the management in 15% of our patients.	4
57. Han DH, Jeong YS, Choo MS, Lee KS. Outcomes of surgery of female urethral diverticula classified using magnetic resonance imaging. <i>Eur Urol.</i> 2007; 51(6):1664-1670.	Observational-Tx	30 women	To evaluate the surgical outcomes of transvaginal diverticulectomies classified using MRI.	17 cases (57%) had simple diverticula, 3 (10%) had U-shaped diverticula, and 10 (33%) had circumferential diverticula. After the first operation, 23 cases (77%) were cured. None of the simple diverticula recurred, but 33% of the U-shaped and 60% of the circumferential diverticula did recur. Of the 7 recurrent cases, 3 did not require a second operation because their symptoms resolved. Of the 4 cases that underwent a second operation, 3 were cured and 1 was cured after 2 additional operations. The success rate for circumferential diverticula after initial diverticulectomies was less than that of simple or U-shaped diverticula (P<0.05). Location, size, and multiplicity of urethral diverticula did not affect the surgical outcome (P>0.05).	2

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
58. Ockrim JL, Allen DJ, Shah PJ, Greenwell TJ. A tertiary experience of urethral diverticulectomy: diagnosis, imaging and surgical outcomes. <i>BJU Int.</i> 2009; 103(11):1550-1554.	Review/Other-Dx	30 consecutive patients	To review the outcomes of consecutive patients referred with urethral diverticula to a tertiary centre; to investigate the diagnostic, imaging and surgical factors relevant to success.	All patients were tertiary referrals, 4 after failed local repairs. The mean (range) interval between initial presentation and repair was 48 (1-264) months. Only 7 patients (23%) had all 3 symptoms of the classical triad of dysuria, dyspareunia and dribble, whilst 23% did not have any of these symptoms. Transvaginal US showed the diverticulum in 6/9 patients, voiding cystourethrography in 13/18 patients (72%) and MRI in all 11 patients assessed. MRI accurately imaged diverticular configuration, whilst voiding cystourethrography assessed detrusor and sphincteric function. 29 (97%) patients were cured of their diverticulum; all 19 patients with simple diverticula were cured at first attempt, whilst 17 procedures were performed on the 11 patients with complex diverticula. 20/24 (83%) repairs were successful using three-layered closure, 9/11 using Martius interposition, and one using bulbospongiosus muscle interposition. There were three primary repair failures; two circumferential diverticula repaired with Martius interposition and one partial horseshoe diverticulum repaired without interposition had partial recurrences. Both were subsequently repaired successfully. One patient with chronic urethral pain from multiple, infected recurrences was eventually diverted. A pubovaginal sling procedure was required in only one (3.3%) patient with persistent pre-existing SUI.	4
59. Hahn WY, Israel GM, Lee VS. MRI of female urethral and periurethral disorders. <i>AJR.</i> 2004; 182(3):677-682.	Review/Other-Dx	N/A	To illustrate the MRI findings of perineal cystic lesions and to show the features that differentiates them.	No results stated in abstract.	4

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
60. Asfaw TS, Greer JA, Ramchandani P, Schimpf MO. Utility of preoperative examination and magnetic resonance imaging for diagnosis of anterior vaginal wall masses. <i>Int Urogynecol J.</i> 2012; 23(8):1055-1061.	Observational-Dx	47 women	To evaluate the role and accuracy of preoperative examination and MRI for these masses.	Analysis after chart review on 47 women was performed. Of the 34 women who had surgery, 28 (82.4%) also underwent an MRI. MRI diagnosis was accurate in 22/28 women compared to histology, inconclusive in 4, and inaccurate in 2. Preoperative diagnosis, including exam, MRI, and cystourethroscopy, had a diagnostic accuracy of 94.1% compared to postoperative diagnosis. The PPV of MRI alone was 91.7%.	3
61. Elsayes KM, Mukundan G, Narra VR, Abou El Abbass HA, Prasad SR, Brown JJ. Endovaginal magnetic resonance imaging of the female urethra. <i>J Comput Assist Tomogr.</i> 2006; 30(1):1-6.	Review/Other-Dx	N/A	To discuss the utility of endovaginal MRI in the detection and characterization of a wide spectrum of urethral pathologic conditions, such as congenital anomalies, diverticula, urethritis, and benign and malignant neoplasms.	No results stated in abstract.	4
62. Dobben AC, Terra MP, Deutekom M, et al. Anal inspection and digital rectal examination compared to anorectal physiology tests and endoanal ultrasonography in evaluating fecal incontinence. <i>Int J Colorectal Dis.</i> 2007; 22(7):783-790.	Observational-Dx	312 patients	To examine if and how findings of anal inspection and rectal examination are associated with anorectal function tests and EAUS.	Absent, decreased and normal resting and squeeze pressures at rectal examination correlated to some extent with mean (+/-SD) manometric findings: mean resting pressure 41.3 (+/-20), 43.8 (+/-20) and 61.6 (+/-23) Hg (P<0.001); incremental squeeze pressure 20.6 (+/-20), 38.4 (+/-31) and 62.4 (+/-34) Hg (P<0.001). EAS defects at rectal examination were confirmed with EAUS for defects <90 degrees in 36% (37/103); for defects between 90-150 degrees in 61% (20/33); for defects between 150-270 degrees in 100% (6/6). Patients with anal scar tissue at anal inspection had lower incremental squeeze pressures (P=0.04); patients with a gaping anus had lower resting pressures (P=0.013) at anorectal manometry. All other findings were not related to any anorectal function test or EAUS.	3

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
63. Lam TJ, Mulder CJ, Felt-Bersma RJ. Critical reappraisal of anorectal function tests in patients with faecal incontinence who have failed conservative treatment. <i>Int J Colorectal Dis.</i> 2012; 27(7):931-937.	Observational-Dx	218 patients	To establish the additive value of performing anorectal function tests in these patients in selecting them for surgery.	In total, 218 patients were evaluated. Of these, 107 (49%) patients had no sphincter defects, 71 (33%) had small defects and 40 (18%) had large defects. Anorectal manometry could not differentiate between patients with and without sphincter defects. Patients with sphincter defects were only found to have a significantly shorter sphincter length and reduced rectal capacity compared to patients without sphincter defects. 43 patients (20%) had a normal anal pressures ≥ 40 mmHg. 17 patients (8%) had also a dyssynergic pelvic floor both on clinical examination and anorectal manometry. 15 patients (7%) had a reduced rectal capacity between 65 and 100 mL. There was no difference in anal pressures or the presence of sphincter defects in these patients compared to patients with a rectal capacity >150 mL. There was no correlation between anorectal manometry, endosonography and faecal incontinence severity scores.	3
64. Sultan AH, Kamm MA, Talbot IC, Nicholls RJ, Bartram CI. Anal endosonography for identifying external sphincter defects confirmed histologically. <i>Br J Surg.</i> 1994; 81(3):463-465.	Observational-Dx	12 patients	To validate the interpretation of US images of external sphincter defects using histology as a 'gold standard'. In addition the accuracy of clinical examination, manometry, electromyography mapping and anal endosonography in the diagnosis of sphincter defects were compared prospectively.	Combined operative and histological examination identified an external sphincter defect in 9/12 patients. Anal endosonography correctly identified all 9 defects and the 3 normal sphincters. The accuracy of clinical examination was 50% and that of both electromyography and anal manometry 75%.	3
65. Gold DM, Halligan S, Kmiot WA, Bartram CI. Intraobserver and interobserver agreement in anal endosonography. <i>Br J Surg.</i> 1999; 86(3):371-375.	Observational-Dx	51 patients	To determine intraobserver and interobserver agreement for sonographic measurements of anal canal structures using anal endosonography, and to determine interobserver agreement for the diagnosis of anal sphincter disruption.	Intraobserver agreement was better than interobserver agreement for measurements of anal canal structures. Interobserver limits of agreement for external sphincter measurements spanned 5 mm, whereas those for the internal sphincter spanned 1.5 mm. Interobserver agreement for diagnosis of sphincter disruption and internal sphincter echogenicity was very good ($\kappa = 0.80$ and 0.74 respectively).	3

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
66. Beets-Tan RG, Morren GL, Beets GL, et al. Measurement of anal sphincter muscles: endoanal US, endoanal MR imaging, or phased-array MR imaging? A study with healthy volunteers. <i>Radiology</i> . 2001; 220(1):81-89.	Observational-Dx	60 patients	To compare EAUS, endoanal MRI, and phased-array MRI for anal sphincter muscle measurement.	Both MR methods had good reliability for measurements of all sphincter components, whereas EAUS was reliable for internal sphincter measurement only. There was little correlation between the techniques, except between the two MR techniques, with a strong correlation for total sphincter and perineal body thickness. The internal sphincter thickened significantly (P=.002) with age at EAUS and endoanal MRI but not at phased-array MRI. There were small sex-based differences in sphincter muscle measurements at phased-array MRI only.	1
67. Abdool Z, Sultan AH, Thakar R. Ultrasound imaging of the anal sphincter complex: a review. <i>Br J Radiol</i> . 2012; 85(1015):865-875.	Review/Other-Dx	N/A	To conduct a MEDLINE search (1950 to February 2010) and critically reviewed studies using the three imaging techniques in evaluating anal sphincter integrity.	No results stated in abstract.	4
68. Cazemier M, Terra MP, Stoker J, et al. Atrophy and defects detection of the external anal sphincter: comparison between three-dimensional anal endosonography and endoanal magnetic resonance imaging. <i>Dis Colon Rectum</i> . 2006; 49(1):20-27.	Observational-Dx	18 patients	To compare prospectively 3-D anal endosonography to MRI in the detection of atrophy and defects of the EAS in patients with fecal incontinence. In addition, to compare both techniques for anal sphincter thickness and length measurements.	18 patients were included (median age, 58 years; range, 27-80; 15 women). 3-D anal endosonography and MRI did not significantly differ for the detection of EAS atrophy (P=0.25) and defects (P=0.38). 3-D anal endosonography demonstrated atrophy in 16 patients, MRI detected atrophy in 13 patients. 3-D anal endosonography agreed with MRI in 15/18 patients for the detection of EAS atrophy. Using the grading system, 8/18 patients scored the same grade. 3-D anal endosonography detected 7 EAS defects and MRI detected 10. 3-D anal endosonography and MRI agreed on the detection of EAS defects in 13/18 patients. Comparison between 3-D anal endosonography and MRI for sphincter thickness and length measurements showed no statistically significant concordance and had no correlation with EAS atrophy.	3

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
69. West RL, Dwarkasing S, Briel JW, et al. Can three-dimensional endoanal ultrasonography detect external anal sphincter atrophy? A comparison with endoanal magnetic resonance imaging. <i>Int J Colorectal Dis.</i> 2005; 20(4):328-333.	Observational-Dx	18 women	To establish whether 3-D EAUS measurements can be used to detect EAS atrophy. For this purpose 3-D EUS measurements were compared with endoanal MRI measurements.	18 parous women (median age 56 years, range 32-80) with symptoms of faecal incontinence were included. Agreement between 3-D EAUS and endoanal MRI was 61% for IAS defects and 88% for EAS defects. EAS atrophy was seen in all patients on endoanal MRI. Correlation between the two methods for EAS thickness, length and area was poor. In addition, correlation was also poor for EAS volume determined on 3-D EAUS, and EAS thickness and area measured on endoanal MRI.	2
70. Rociu E, Stoker J, Eijkemans MJ, Schouten WR, Lameris JS. Fecal incontinence: endoanal US versus endoanal MR imaging. <i>Radiology.</i> 1999; 212(2):453-458.	Observational-Dx	22 women	To assess EAUS and endoanal MRI for mapping of anal sphincter defects that have been validated at surgery in patients with fecal incontinence.	Endoanal MRI findings showed better agreement with surgical results than did EAUS findings for diagnosis of lesions of the external sphincter (kappa value, 0.85 vs 0.53) and of the internal sphincter (kappa value, 0.64 vs 0.49). EAUS could not accurately demonstrate thinning of the external sphincter. MRI results correlated moderately with US results (kappa = 0.39). If endoanal MRIs alone had been considered, the correct surgical decision would have been made in 21 (95%) patients; if EAUS images alone had been considered, the correct decision would have been made in 17 (77%) patients.	2
71. Dobben AC, Terra MP, Slors JF, et al. External anal sphincter defects in patients with fecal incontinence: comparison of endoanal MR imaging and endoanal US. <i>Radiology.</i> 2007; 242(2):463-471.	Observational-Dx	237 patients	To prospectively compare in a multicenter study the agreement between endoanal MRI and EAUS in depicting EAS defects in patients with fecal incontinence.	Agreement between endoanal MRI and EAUS was fair for the depiction of sphincter defects (kappa = 0.24 [95% CI, 0.12, 0.36]). At surgery, EAS defects were found in 31 (86%) of 36 patients. There was no significant difference between MRI and US in the depiction of sphincter defects (P=.23). Sensitivity and PPV were 81% and 89%, respectively, for endoanal MRI and 90% and 85%, respectively, for EAUS.	1

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
72. Pinta T, Kylanpaa ML, Luukkonen P, Tapani E, Kivisaari A, Kivisaari L. Anal incontinence: diagnosis by endoanal US or endovaginal MRI. <i>Eur Radiol.</i> 2004; 14(8):1472-1477.	Observational-Dx	19 patients	To evaluate the possibility of using a prostatic coil endovaginally in detecting anal sphincter defects and to assess the value of prospective, preoperative EAUS and endovaginal MRI examinations in detecting sphincter defects of individuals with faecal incontinence against the sphincter defects validated at operation.	In diagnosing EAS defects, EAUS and endovaginal MRI showed almost similar agreement with surgical findings, 12 (63%) out of 19 vs 11 (58%), respectively. IAS defects were equally detected by EAUS and endovaginal MRI as compared with surgical diagnosis. There was considerable variation between radiologists in diagnosing defects by endovaginal MRI. EAUS and endovaginal MRI are equal in diagnosing anal sphincter defects.	2
73. Briel JW, Zimmerman DD, Stoker J, et al. Relationship between sphincter morphology on endoanal MRI and histopathological aspects of the external anal sphincter. <i>Int J Colorectal Dis.</i> 2000; 15(2):87-90.	Observational-Dx	25 consecutive unselected women	To validate the MRI interpretation of the EAS using histology as a "gold standard."	All patients underwent anterior sphincteroplasty within 6 months of the preoperative assessment. During sphincter repair, a biopsy specimen was taken both from the left and right lateral parts of the EAS. MRI revealed EAS atrophy in 9/25 patients (36%). Histopathological investigation confirmed these findings in all but one. In one additional patient atrophy was detected on histological investigation while the morphology of the EAS was classified as normal on MRI. In detecting sphincter atrophy endoanal MRI showed 89% sensitivity, 94% specificity, 89% PPV, and 94% NPV. MRI correctly identified sphincter morphology in 23/25 cases (92%).	2

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
74. Dobben AC, Terra MP, Deutekom M, et al. The role of endoluminal imaging in clinical outcome of overlapping anterior anal sphincter repair in patients with fecal incontinence. <i>AJR</i> . 2007; 189(2):W70-77.	Observational-Dx	30 patients	To investigate whether endoluminal imaging can identify determinants that plays a role in the outcome of sphincter repair.	After surgery, the mean Vaizey score in 30 patients (97% females; mean age, 50 years) had improved from 18 to 13 (P<0.001). MRI showed that baseline measurement of preserved EAS thickness correlated with a better outcome (r = 0.42; P=0.03). Clinical outcome did not differ between patients with and those without a persistent EAS defect (P=0.54) or EAS atrophy (P=0.26) depicted on MRI. Patients with a visible overlap and <20% fat tissue had a better outcome than patients with nonvisible, fatty overlap (decrease in Vaizey score, 7 vs 2 points, respectively; P=0.04). US showed that patients with a persistent EAS defect had a worse outcome than those without an EAS defect (17 vs 10 points, respectively; P=0.003).	3
75. Heilbrun ME, Nygaard IE, Lockhart ME, et al. Correlation between levator ani muscle injuries on magnetic resonance imaging and fecal incontinence, pelvic organ prolapse, and urinary incontinence in primiparous women. <i>Am J Obstet Gynecol</i> . 2010; 202(5):488 e481-486.	Observational-Dx	206 patients	To correlate the presence of major levator ani muscle injuries on MRI with fecal incontinence, POP, and urinary incontinence in primiparous women 6-12 months postpartum.	Major levator ani muscle injuries were observed in 17/89 (19.1%) women who delivered vaginally with EAS injuries, 3/88 (3.5%) who delivered vaginally without EAS injury, and 0/29 (0%) who delivered by cesarean section before labor (P=.0005). Among women with EAS injuries, those with major levator ani muscle injuries trended toward more fecal incontinence, 35.3% vs 16.7% (P=.10) and POP, 35.3% vs 15.5% (P=.09), but not urinary incontinence (P=1.0).	2

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
76. Terra MP, Beets-Tan RG, Vervoorn I, et al. Pelvic floor muscle lesions at endoanal MR imaging in female patients with faecal incontinence. <i>Eur Radiol.</i> 2008; 18(9):1892-1901.	Review/Other-Dx	105 women	To evaluate the frequency and spectrum of lesions of different pelvic floor muscles at endoanal MRI in women with severe faecal incontinence and to study their relation with incontinence severity and manometric findings.	In 105 women MRI examinations were evaluated for IAS, EAS, and puborectal muscle and levator ani lesions. The relative contribution of lesions to differences in incontinence severity and manometric findings was studied. IAS (n=59) and EAS (n=61) defects were more common than puborectal muscle (n=23) and levator ani (n=26) defects. Puborectal muscle and levator ani defects presented mainly with IAS and/or EAS defects (isolated n=2 and n=3). EAS atrophy (n=73) was more common than IAS (n=19), puborectal muscle (n=16) and levator ani (n=9) atrophy and presented mainly isolated. Puborectal muscle and levator ani atrophy presented primarily with EAS atrophy (isolated n=3 and n=1). Patients with IAS and EAS lesions had a lower resting and squeeze pressure, respectively; no other associations were found. Puborectal muscle and levator ani lesions are relatively common in patients with severe faecal incontinence, but the majority of lesions are found in women who also have IAS and/or EAS lesions. Only an association between anal sphincter lesions and manometry was observed.	4
77. Terra MP, Beets-Tan RG, van Der Hulst VP, et al. Anal sphincter defects in patients with fecal incontinence: endoanal versus external phased-array MR imaging. <i>Radiology.</i> 2005; 236(3):886-895.	Observational-Dx	30 patients	To prospectively compare external phased-array MRI with endoanal MRI in depicting EAS and IAS defects in patients with fecal incontinence and to prospectively evaluate observer reproducibility in the detection of EAS and IAS defects with both MRI techniques.	Both MRI techniques did not significantly differ in the depiction of external (P>.99) and internal (P>.99) anal sphincter defects. The techniques corresponded in 25 (83%) of 30 patients for the depiction of EAS defects and in 28 (93%) of 30 patients for the depiction of IAS defects. Interobserver agreement was moderate to good for endoanal MRI and poor to fair for external phased-array MRI. Intraobserver agreement ranged from fair to very good for both imaging techniques.	1

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
78. Terra MP, Beets-Tan RG, van der Hulst VP, et al. MRI in evaluating atrophy of the external anal sphincter in patients with fecal incontinence. <i>AJR</i> . 2006; 187(4):991-999.	Observational-Dx	30 patients	To compare external phased-array MRI to endoanal MRI for depicting EAS atrophy in patients with fecal incontinence and to evaluate observer reproducibility in detecting EAS atrophy with these techniques.	The MRI techniques did not significantly differ in their ability to depict EAS atrophy (P=0.63) with good agreement (kappa = 0.72). Interobserver agreement was moderate (kappa = 0.53-0.56) for endoanal MRI and moderate to good (kappa = 0.55-0.8) for external phased-array MRI. Intraobserver agreement was moderate to very good (kappa = 0.57-0.86) for endoanal MRI and fair to very good (kappa = 0.31-0.86) for external phased-array MRI.	1
79. Hetzer FH, Andreisek G, Tsagari C, Sahrbacher U, Weishaupt D. MR defecography in patients with fecal incontinence: imaging findings and their effect on surgical management. <i>Radiology</i> . 2006; 240(2):449-457.	Observational-Dx	50 patients	To retrospectively evaluate MR defecography findings in patients with fecal incontinence who were evaluated for surgical treatment and to assess the influence of MR defecography on surgical therapy.	MR defecography revealed rectal descent of more than 6 cm (relative to the PCL) in 47 (94%) of 50 patients. A bladder descent of more than 3 cm was present in 20 (40%) of 50 patients, and a vaginal vault descent of more than 3 cm was present in 19 (43%) of 44 women. Moreover, 17 (34%) anterior proctoceles, 16 (32%) enteroceles, and 10 (20%) rectal prolapses were noted. Interobserver agreement was good to excellent (kappa = 0.6-0.91) for image analysis results. MR defecography findings led to changes in the surgical approach in 22 (67%) of 33 patients who underwent surgery.	3

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
80. Bharucha AE, Wald A, Enck P, Rao S. Functional anorectal disorders. <i>Gastroenterology</i> . 2006; 130(5):1510-1518.	Review/Other-Dx	N/A	To define criteria for diagnosing functional anorectal disorders (ie, fecal incontinence, anorectal pain, and disorders of defecation).	Functional fecal incontinence is a common, but underrecognized symptom, which is equally prevalent in men and women, and can often cause considerable distress. The clinical features are useful for guiding diagnostic testing and therapy. Functional anorectal pain syndromes include proctalgia fugax (fleeting pain) and chronic proctalgia; chronic proctalgia may be subdivided into levator ani syndrome and unspecified anorectal pain, which are defined by arbitrary clinical criteria. Functional defecation disorders are characterized by 2 or more symptoms of constipation, with ≥ 2 of the following features during defecation: impaired evacuation, inappropriate contraction of the pelvic floor muscles, and inadequate propulsive forces. Functional disorders of defecation may be amenable to pelvic floor retraining by biofeedback therapy (such as dyssynergic defecation).	4
81. Vidlock EJ, Lembo A, Cremonini F. Diagnostic testing for dyssynergic defecation in chronic constipation: meta-analysis. <i>Neurogastroenterol Motil</i> . 2013; 25(6):509-520.	Review/Other-Dx	79 studies on 7,581 patients	To estimate the prevalence of abnormal findings associated with dyssynergic defecation across testing modalities in patients referred for physiological testing for chronic constipation.	A total of 79 studies on 7,581 chronic constipation patients were included. The median prevalence of any single abnormal finding associated with dyssynergic defecation was 37.2%, ranging from 14.9% (95% CI, 7.9-26.3) for absent opening of the anorectal angle on defecography to 52.9% (95% CI, 44.3-61.3) for a dyssynergic pattern on US. The prevalence of a dyssynergic pattern on manometry was 47.7% (95% CI, 39.5-56.1). The prevalence of dyssynergic defecation was similar across specialty and geographic area as well as when restricting to studies using Rome criteria to define constipation.	4

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
82. Halligan S, Malouf A, Bartram CI, Marshall M, Hollings N, Kamm MA. Predictive value of impaired evacuation at proctography in diagnosing anismus. <i>AJR</i> . 2001; 177(3):633-636.	Observational-Dx	31 patients	To determine the PPV of impaired evacuation during evacuation proctography for the subsequent diagnosis of anismus.	28 (90%) of the 31 patients with impaired proctographic evacuation were found to have anismus at subsequent physiologic testing. Among the 28 were all 10 patients who evacuated no contrast medium and all 11 patients with inadequate pelvic floor descent, giving evacuation proctography a PPV of 90% for the diagnosis of anismus. A prominent puborectal impression was seen in only 3 subjects during proctography, one of whom subsequently showed no physiologic sign of anismus.	3
83. Bharucha AE, Wald AM. Anorectal disorders. <i>Am J Gastroenterol</i> . 2010; 105(4):786-794.	Review/Other-Dx	N/A	No abstract available.	No abstract available.	4
84. Rao SS, Ozturk R, Laine L. Clinical utility of diagnostic tests for constipation in adults: a systematic review. <i>Am J Gastroenterol</i> . 2005; 100(7):1605-1615.	Review/Other-Dx	N/A	To perform a systematic review of diagnostic tests commonly used in constipation.	No studies assessed the routine use of blood tests or abdominal X-ray. One retrospective endoscopic study showed that cancer and polyp detection rate was comparable to historical controls. Two studies of barium enema were unhelpful in diagnosis of constipation. Physiological studies showed differences in study population, methodology, and interpretation, and there was no gold standard. 10 colonic transit studies showed prevalence of 38%-80% in support of slow transit constipation. 9 anorectal manometry studies showed prevalence of 20%-75% for detecting dyssynergia. 9 studies of balloon expulsion showed impaired expulsion of 23%-67%. Among 10 defecography studies, abnormalities were reported in 25%-90% and dyssynergia in 13%-37%.	4

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
85. Shorvon PJ, McHugh S, Diamant NE, Somers S, Stevenson GW. Defecography in normal volunteers: results and implications. <i>Gut</i> . 1989; 30(12):1737-1749.	Review/Other-Dx	47 patients	To determine the range of defecographic findings encountered in healthy young volunteer subjects who were not otherwise preselected. A further aim was to examine the findings according to current understanding of the continence and defecation mechanisms; in particular, the role and interaction between anal sphincter, puborectalis and/or levator muscles, and pelvic floor movement.	47 healthy young volunteers underwent defecographic examination to determine the range of normal findings. Normality was shown to encompass radiological features often considered pathological. These features included broad ranges of anorectal angle and pelvic floor descent which overlap with reported pathological states. Furthermore, the formation of rectocoeles during defecation was a very common finding in women. Finally, a subgroup of the volunteers had marginal anorectal function. The marginal anorectal function and certain radiological findings such as rectocoeles or intussusceptions may predispose to later problems, or contribute to clinical problems when combined with other factors such as dietary fiber deficiency.	4
86. Agachan F, Pfeifer J, Wexner SD. Defecography and proctography. Results of 744 patients. <i>Dis Colon Rectum</i> . 1996; 39(8):899-905.	Review/Other-Dx	744 patients	To assess the incidence and clinical significance of defecographic findings in patients with possible evacuation disorders.	Between July 1988 and July 1995, 744 patients (566 females and 178 males) with a mean age of 63.5 (range, 12-95) years had defecographic and proctographic examination. 446 (60%) patients were diagnosed who complained of constipation, 123 (16.5%) of fecal incontinence, 42 (5.6%) of rectal prolapse, 82 (11%) of rectal pain, and 51 (6.9%) had a combination of more than one of these diagnoses. Although 93 (12.5%) of these evaluations were considered normal, 61 (8%) revealed rectal prolapse, 191 (25.7%) rectocele, 82 (11%) sigmoidocele, and 94 (12.6%) intussusception; in 223 (30%) patients, a combination of these findings was noted. Patients with paradoxical puborectalis contraction had an extremely high frequency of constipation compared with other symptoms (P<0.0001).	4

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
87. Ott DJ, Donati DL, Kerr RM, Chen MY. Defecography: results in 55 patients and impact on clinical management. <i>Abdom Imaging</i> . 1994; 19(4):349-354.	Observational-Dx	55 consecutive patients	To review the medical records and defecograms in patients to determine the impact of results of defecography on clinical management.	In the normal group, 15 patients were managed medically, 7 surgically, and 4 lost to follow-up. Clinical improvement occurred in 13 (59%) of 22 patients, with similar results between medical (60%) and surgical (57%) therapy. In the abnormal group, 16 had medical management, 7 had surgical therapy, and 6 lost to follow-up. Clinical improvement occurred in 13 (57%) of 23 patients but surgical therapy showed more improvement.	4
88. Renzi A, Izzo D, Di Sarno G, et al. Cinedefecographic findings in patients with obstructed defecation syndrome. A study in 420 cases. <i>Minerva Chir</i> . 2006; 61(6):493-499.	Review/Other-Dx	420 patients	To analyze the cinedefecographic findings in a group of patients with obstructed defecation syndrome.	Between February 2002 and March 2005, 420 patients, 404 (96.1%) females and 16 (3.8%) males with a mean age of 49+/-7.7 (range, 21-77) years, underwent cinedefecographic. In 362 (86.2%) patients cinedefecographic showed a combination of different cinedefecographic findings. Rectocele, fixed perineal descent and dynamic perineal descent in association with recto-anal intussusception or recto-rectal intussusception were contemporary observed in 118 (26%) patients. Mucosal rectal prolapse, recto-rectal intussusception, recto-anal intussusception, and rectocele were observed as singular finding in 21 (5%), 19 (4.5%), 12 (2.8%), 3 (0.7%) and 3 (0.7%) patients, respectively. In 6 (1.4%) patients a paradoxical contraction of the puborectalis muscle was observed.	4

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
89. Harvey CJ, Halligan S, Bartram CI, Hollings N, Sahdev A, Kingston K. Evacuation proctography: a prospective study of diagnostic and therapeutic effects. <i>Radiology</i> . 1999; 211(1):223-227.	Observational-Dx	50 patients	To determine the diagnostic and therapeutic effects of evacuation proctography.	Diagnostic confidence rose significantly after evacuation proctography (mean, 7.0 before evacuation proctography vs 8.4 after evacuation proctography; P<.001). Lead diagnosis changed in 9 (18%) patients. Intended surgical management became nonsurgical after evacuation proctography in 7 (14%) patients, and intended nonsurgical therapy became surgical in 2 (4%). Surgery remained likely in 15 patients, but its nature changed in 5 (10%). 5 (10%) clinicians stated that evacuation proctographic findings resolved diagnostic conflict, and 9 (18%) found that evacuation proctographic findings revealed unsuspected diagnoses. Clinicians found evacuation proctography of major benefit in 20 (40%) cases studied and of moderate benefit in 20 (40%). In general, 20 (43%) clinicians found evacuation proctography very useful and 24 (51%) found it moderately useful.	3
90. Finco C, Savastano S, Luongo B, et al. Colpocystodefecography in obstructed defecation: is it really useful to the surgeon? Correlating clinical and radiological findings in surgery for obstructed defecation. <i>Colorectal Dis</i> . 2008; 10(5):446-452.	Observational-Dx	20 patients	To evaluate the pre- and postoperative consistency between clinical and colpocystodefecographic findings in patients undergoing surgery for obstructed defecation.	At 6 months the questionnaire revealed a major response in terms of symptoms. The proctological visit confirmed the absence of rectocele in 19 (95%) patients, while the anorectal prolapse had completely disappeared in 17 (85%) patients. Postoperative colpocystodefecography demonstrated a general reduction in the dimensions of the rectocele, which had completely disappeared in 5 (25%) patients; 40% of the patients had a persistent anorectal prolapse.	3

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
91. Apostolis C, Wallace K, Sasson P, Hacker MR, Elkadry E, Rosenblatt PL. Assessment of women with defecatory dysfunction and manual splinting using dynamic pelvic floor magnetic resonance imaging. <i>Female Pelvic Med Reconstr Surg.</i> 2012; 18(1):18-24.	Observational-Dx	29 women	To describe MRI findings in women with defecatory dysfunction who perform manual splinting.	From September 2008 to October 2010, 29 women reported defecatory dysfunction and the need for manual splinting. Their mean (SD) age was 55.2 (10.5) years. MRIs showed a rectocele in 86.2% of the study group, cystocele in 75.9%, enterocele in 10.3%, and a defect of the levator ani muscles in 17.2%. 21 (72.4%) women had more than 1 of these defects. In addition, 27.6% had an anorectal angle less than 90 degrees or greater than 105 degrees. Patients in the study group splinted in the vagina (58.6%), on the perineum (31.0%), or on the buttock (10.3%). In all but 1 woman (96.6%), splinting improved or completely corrected the identified defect(s) as evidenced with MRI. Among those who used vaginal splinting, 52.9% of defects were corrected and 47.1% were improved. Perineal splinting corrected 55.6% and improved 33.3% of cases and was ineffective in 11.1% of cases, whereas buttock splinting corrected 33.3% and improved 66.7% of cases.	3
92. Reiner CS, Tutuian R, Solopova AE, Pohl D, Marincek B, Weishaupt D. MR defecography in patients with dyssynergic defecation: spectrum of imaging findings and diagnostic value. <i>Br J Radiol.</i> 2011; 84(998):136-144.	Observational-Dx	48 patients	To describe the spectrum of findings and the diagnostic value of MR defecography in patients referred with suspicion of dyssynergic defecation.	The most frequent finding was impaired evacuation, which was seen in 100% of patients with dyssynergic defecation and in 83% of the control group, yielding a sensitivity for MR defecography for the diagnosis of dyssynergic defecation of 100% (95% CI, 97%-100%), but a specificity of only 23% (95% CI, 7%-40%). A lower sensitivity (50%; 95% CI, 24%-76%) and a high specificity (97%; 95% CI, 89%-100%) were seen with abnormal anorectal angle-change. The sensitivity of paradoxical sphincter contraction was relatively high (83%; 95% CI, 63-100%). A combined analysis of abnormal anorectal angle-change and paradoxical sphincter contraction allowed for the detection of 94% (95% CI, 81%-100%) of the patients with dyssynergic defecation.	2

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
93. Elshazly WG, El Nekady Ael A, Hassan H. Role of dynamic magnetic resonance imaging in management of obstructed defecation case series. <i>Int J Surg.</i> 2010; 8(4):274-282.	Observational-Dx	40 consecutive patients	To evaluate the role of dynamic MRI defecography, and to elucidate the underlying anatomic and pathophysiologic background of pelvic floor disorders in these patients in order to minimize failures.	The dynamic MRI of the pelvic floor showed 23 patients with descending perineum, 32 rectoceles (28 females), 12 cystoceles (10 females), 6 enteroceles (4 females), 18 intussusceptions (14 females), and 7 dyskinetic puborectalis muscle (3 females). The diagnosis of combined pelvic floor disorders with dynamic MRI defecography was consistent with clinical results in 70% and there were additional diagnostic parameters in 30% of patients. Dynamic MRI findings changed treatment decision in 8 patients 20% with surgical treatment performed in 25 patients (8 stappled trans-anal rectal resection, 11 trans-anal Delorme's, 6 trans-abdominal combined repair), and conservative treatment in 15 patients.	2
94. DeLancey JO, Morgan DM, Fenner DE, et al. Comparison of levator ani muscle defects and function in women with and without pelvic organ prolapse. <i>Obstet Gynecol.</i> 2007; 109(2 Pt 1):295-302.	Observational-Dx	151 cases; 135 controls	To compare levator ani defects and pelvic floor function among women with prolapse and controls.	Cases were more likely to have major levator ani defects than controls (55% compared with 16%), with an adjusted OR of 7.3 (95% CI, 3.9-13.6, P<.001) but equally likely to have minor defects (16% compared with 22%). Of women who reported delivery by forceps, 53% had major defects compared with 28% for the nonforceps women, adjusted OR 3.4 (95% CI, 1.95-5.78). Women with prolapse generated less vaginal closure force during pelvic muscle contraction than controls (2.0 Newtons compared with 3.2 Newtons P<.001), whereas those with defects generated less force than women without defects (2.0 Newtons compared with 3.1 Newtons, P<.001). The genital hiatus was 50% longer in cases than controls (4.7+/-1.4 cm compared with 3.1+/-1.0 cm, P<.001).	3

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
95. Hsu Y, Chen L, Huebner M, Ashton-Miller JA, DeLancey JO. Quantification of levator ani cross-sectional area differences between women with and those without prolapse. <i>Obstet Gynecol.</i> 2006; 108(4):879-883.	Observational-Dx	30 women with prolapse and 30 women with normal pelvic support	To compare levator ani cross-sectional area as a function of prolapse and muscle defect status.	The ventral component of the levator muscle of women with major defects had a 36% smaller cross-sectional area, and women with minor defects had a 29% smaller cross-sectional area compared with the women with no defects ($P<.001$). In the dorsal component, there were significant differences in cross-sectional area according to defect status ($P=.03$); women with major levator defects had the largest cross-sectional area compared with the other defect groups. For each defect severity category (none, minor, major), there were no significant differences in cross-sectional area between women with and those without prolapse.	3
96. Clark NA, Brincat CA, Yousuf AA, Delancey JO. Levator defects affect perineal position independently of prolapse status. <i>Am J Obstet Gynecol.</i> 2010; 203(6):595 e517-522.	Observational-Dx	40 women	To determine the effect of levator defects on perineal position and movement irrespective of prolapse status.	In women with levator defects, independently of prolapse status: (1) At rest, the perineal body was 1.3 cm, and the anal sphincter was 1.0 cm more caudal ($P\leq.01$); at maximum contraction, the perineal body and the anal sphincter were both 1.2 cm more caudal ($P\leq.01$); with maximum Valsalva maneuver, the perineal body was 1.3 cm more caudal, and the anal sphincter was 1.2 cm more caudal ($P\leq.01$). (2) At rest, the levator hiatus was 0.8 cm larger, and the urogenital hiatus was 1.0 cm larger ($P\leq.01$). (3) At rest, the bladder was 0.07 cm more posterior ($P\leq .02$); with maximum contraction, it was 1.9 cm lower ($P\leq.02$). (4) With maximum Valsalva maneuver, the bladder was 1.5 cm lower and displaced further caudally ($P\leq.03$).	3

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
97. Lewicky-Gaupp C, Brincat C, Yousuf A, Patel DA, Delancey JO, Fenner DE. Fecal incontinence in older women: are levator ani defects a factor? <i>Am J Obstet Gynecol.</i> 2010; 202(5):491 e491-496.	Observational-Dx	26 patients	To compare pelvic floor structure and function between older women with and without fecal incontinence and young continent women.	Levator ani defects were more common in the older incontinent vs the young continent (75% vs 11%, P=.01) and older continent (22%, P=.14) groups; women with fecal incontinence were more likely to have levator ani defects than women without (OR, 14.0, 95% CI, 1.8-106.5). Older incontinent women generated 27.0% and 30.1% less force during maximum contraction vs the older continent (P=.13) and young continent (P=.04) groups. During Kegel, older incontinent absolute structural displacements were smaller than in the older continent group (P=.01).	3
98. Morgan DM, Larson K, Lewicky-Gaupp C, Fenner DE, DeLancey JO. Vaginal support as determined by levator ani defect status 6 weeks after primary surgery for pelvic organ prolapse. <i>Int J Gynaecol Obstet.</i> 2011; 114(2):141-144.	Observational-Dx	107 patients	To evaluate whether major levator ani muscle defects were associated with differences in postoperative vaginal support after primary surgery for POP.	Support of the anterior vaginal wall 2 cm above the hymen occurred among 62% of women with normal levator ani muscles/minor defects and 35% of those with major defects. Support of the anterior wall 1cm above the hymen occurred among 32% women with normal muscles /minor defects and 59% of those with major defects. Levator ani defects were not associated with differences in postoperative apical/posterior vaginal support.	4
99. Rane A, Goh J, Krause H, Dietz HP. Is Levator Avulsion a predictor for cystocele recurrence following anterior vaginal mesh? <i>Ultrasound Obstet Gynecol.</i> 2013.	Review/Other-Dx	209 patients	To determine if levator avulsion is a risk factor for prolapse recurrence following anterior colporrhaphy with mesh.	209 patients (142 Perigee, 67 Prolift) were followed up at a mean of 2.2 years (3 months - 5.6 years). 24% (51/209) had recurrent prolapse symptoms, 33% (68/209) a clinical cystocele recurrence \geq stage 2, and 26% (54/209) a recurrent cystocele on US. 28/80 (35%) women with levator avulsion had a significant sonographic cystocele recurrence (OR 2.24[CI, 1.13-4.43]). This finding was confirmed after adjusting for potential predictors of prolapse recurrence on multivariate logistic regression (OR 2.13 (CI, 1.04 - 4.39); P=0.04).	4

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
100. Vakili B, Zheng YT, Loesch H, Echols KT, Franco N, Chesson RR. Levator contraction strength and genital hiatus as risk factors for recurrent pelvic organ prolapse. <i>Am J Obstet Gynecol.</i> 2005; 192(5):1592-1598.	Observational-Dx	358 patients	To correlate levator ani contraction strength and genital hiatus measurements with surgical failure in prolapse.	The recurrent prolapse rate was 34.6%. Median follow-up interval was 5 months. Diminished levator strength was associated with recurrent prolapse (35.8% vs 0%; P=.017). A genital hiatus 5 cm or greater was associated with recurrent prolapse (44.2% vs 27.8%; P=.034). Inability to contract the levator ani was associated with urinary incontinence (35.1% vs 18.8%; P=.023). Increasing levator contraction strength was associated with a decreased reoperation rate for pelvic floor disorders, whereas genital hiatus correlated best with recurrent prolapse.	4
101. Weemhoff M, Vergeldt TF, Notten K, Serroyen J, Kampschoer PH, Roumen FJ. Avulsion of puborectalis muscle and other risk factors for cystocele recurrence: a 2-year follow-up study. <i>Int Urogynecol J.</i> 2012; 23(1):65-71.	Observational-Dx	245 women	To determine the relationship of recurrent cystocele with avulsion of puborectalis muscle and other risk factors.	Of the 245 women, 156 agreed to the follow-up visit (63.7%). Objective recurrence rate was 80/156 (51.3%). 17/156 (10.9%) reported subjective recurrence. Risk factors for anatomical recurrence were complete avulsion of puborectalis muscle (OR, 2.4; 95% CI, 1.3, 4.7), advanced preoperative stage (OR, 2.0; 95% CI, 1.0, 4.1), family history of prolapse (OR, 2.4; 95% CI, 1.2, 4.9), and sacrospinous fixation (OR, 6.5; 95% CI, 2.0, 21.2).	3

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
102. Morgan DM, Umek W, Stein T, Hsu Y, Guire K, DeLancey JO. Interrater reliability of assessing levator ani muscle defects with magnetic resonance images. <i>Int Urogynecol J. Pelvic Floor Dysfunct.</i> 2007; 18(7):773-778.	Observational-Dx	137 women with prolapse and 134 women with normal support	To determine interrater reliability of assessing pubovisceral levator ani muscle defects with MRIs.	Among six pairs of examiners, percent agreement and weighted kappa coefficients were calculated to determine agreement between pairs of examiners and among all examiners (ie, "overall"). For unilateral scoring, exact agreement was found in 83.7%, and differences of one, two, and three grades were found in 14.7%, 1.5%, and 0.1%, respectively. For bilateral scoring, exact agreement and differences of one, two and three grades were found in 75.4%, 15.9%, 6.9%, and 1.6%, respectively. Thus, exact agreement or a one-point difference was reached in 91.3% of cases. When defect status was categorized as none/normal, minor, and major, the overall weighted kappa coefficient was 0.86 (95% CI, 0.83, 0.89). There was variation among examiner pairs with unilateral (P=0.002) and bilateral (P=0.02) scoring, but not when defect status was categorized as none/normal, minor, and major (P=0.59). There was agreement to within one point in 91% of cases when six examiner pairs scored levator ani defects on a seven-point scale. Examiner pairs discriminated injury similarly when defect status was categorized as normal/none, minor, or major.	3
103. Macura KJ, Genadry RR, Bluemke DA. MR imaging of the female urethra and supporting ligaments in assessment of urinary incontinence: spectrum of abnormalities. <i>Radiographics.</i> 2006; 26(4):1135-1149.	Review/Other-Dx	N/A	To review the spectrum of abnormalities detected at MRI in women with SUI.	The spectrum of abnormalities detected at MRI in women with SUI are classified as (a) findings related to the urethral sphincter deficiency and (b) defects of the urethral support ligaments and urethral hypermobility. These abnormalities include a small urethral sphincter, funneling at the bladder neck, distortion of the urethral support ligaments, cystocele, an asymmetric pubococcygeus muscle, abnormal shape of the vagina, enlargement of the retropubic space, and an increased vesicourethral angle.	4

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
104. el-Sayed RF, Morsy MM, el-Mashed SM, Abdel-Azim MS. Anatomy of the urethral supporting ligaments defined by dissection, histology, and MRI of female cadavers and MRI of healthy nulliparous women. <i>AJR</i> . 2007; 189(5):1145-1157.	Review/Other-Dx	7 formalin-preserved cadavers; MRI of 17 healthy nulliparous women	To define precisely the female urethral support structures at cadaveric anatomic dissection and histologic examination and to determine which of these structures can be detected on MRI of cadaveric specimens and of healthy volunteers.	At cadaveric dissection we identified ventral and dorsal urethral ligaments. The ventral urethral ligaments included the pubourethral ligaments, which were found to consist of three separate components coursing anteroposterior from the bladder neck to the pubic bone; the periurethral ligament; and the paraurethral ligaments. Dorsal to the urethra, a slinglike ligament, which we believe should be named the "suburethral ligament," was identified. This ligament had a distinct plane of cleavage from the anterior vaginal wall. The MRI findings in the volunteers correlated with the MRI and gross anatomic findings in the cadavers. The proximal pubourethral, periurethral, paraurethral, and suburethral ligaments had visibility scores of 3 (moderately visible) or 4 (easily visible) on MRI in 47%, 65%, 47%, and 53% of volunteers, respectively.	4
105. Morgan DM, Umek W, Guire K, Morgan HK, Garabrant A, DeLancey JO. Urethral sphincter morphology and function with and without stress incontinence. <i>J Urol</i> . 2009; 182(1):203-209.	Observational-Dx	103 women with stress incontinence and 108 asymptomatic continent controls	To analyze the relationship between urethral sphincter anatomy, urethral function and pelvic floor function using MRIs.	The striated urogenital sphincter in women with stress incontinence was 12.5% smaller than that in asymptomatic continent women (mean +/- SD length-area index 766.4 +/- 294.3 vs 876.2 +/- 407.3 mm(3), P=0.04). The groups did not differ significantly in striated urogenital sphincter length (13.2 +/- 3.4 vs 13.7 +/- 3.9 mm, P=0.40), thickness (2.83 +/- 0.8 vs 3.11 +/- 1.4 mm, P=0.09) or area (59.1 +/- 18.4 vs 62.9 +/- 24.7 mm(2), P=0.24). Striated urogenital sphincter length and area, and the length-area index were associated during voluntary pelvic muscle contraction with more urethral axis elevation and increased vaginal closure force augmentation.	3

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
106. Tasali N, Cubuk R, Sinanoglu O, Sahin K, Saydam B. MRI in stress urinary incontinence: endovaginal MRI with an intracavitary coil and dynamic pelvic MRI. <i>Urol J.</i> 2012; 9(1):397-404.	Observational-Dx	25 women with SUI and 8 controls	To evaluate both morphology of the urethra and its supporting structures using endovaginal MRI and the grade of the bladder neck prolapsus using dynamic pelvic MRI in women with SUI.	Significant differences were found in the thickness of each three layers of the urethra between the two groups (P<.05). There was a significantly higher pubourethral ligament distortion (P=.024) and larger vesicourethral angle (P=.000) in women with SUI. In women with SUI, there was no significant relationship between the number of deliveries and the degree of the bladder neck prolapsus (P>.05).	2
107. Tunn R, Goldammer K, Neymeyer J, Gauruder-Burmester A, Hamm B, Beyersdorff D. MRI morphology of the levator ani muscle, endopelvic fascia, and urethra in women with stress urinary incontinence. <i>Eur J Obstet Gynecol. Reprod Biol.</i> 2006; 126(2):239-245.	Observational-Dx	54 women	To evaluate pathomorphologic changes of the levator ani muscle, endopelvic fascia, and urethra in women with SUI by MRI.	The urethral sphincter muscle showed a reduced thickness of its posterior portion (37%), an omega shape (13%) or higher signal intensity (50%); its abnormal configuration was associated with an increased signal intensity in 70% (P=0.001). The levator ani muscle comprised a unilateral loss of substance in 30%, a higher signal intensity in 28%, and altered origin in 19%. Central defects of the endopelvic fascia were present in 39% (n=21), lateral defects in 46%. There was a significant association between loss of the symphyseal concavity of the anterior vaginal wall and lateral fascial defects (P=0.001) and levator ani changes (P=0.016).	3
108. Huebner M, Margulies RU, DeLancey JO. Pelvic architectural distortion is associated with pelvic organ prolapse. <i>Int Urogynecol J. Pelvic Floor Dysfunct.</i> 2008; 19(6):863-867.	Observational-Dx	144 cases and 126 controls	To determine whether there is an association between architectural distortion seen on MRI (lateral "spill" of the vagina and posterior extension of the space of Retzius) and POP.	Among the 3 groups, women with levator defects and architectural distortion have the highest proportion of prolapse (78%; P<0.001). Among women with levator defects, those with prolapse had an OR of 2.2 for the presence of architectural distortion (95% CI, 1.1-4.6).	3
109. Larson KA, Luo J, Guire KE, Chen L, Ashton-Miller JA, DeLancey JO. 3D analysis of cystoceles using magnetic resonance imaging assessing midline, paravaginal, and apical defects. <i>Int Urogynecol J.</i> 2012; 23(3):285-293.	Review/Other-Dx	10 women with anterior predominant prolapse and 10 with normal support	To assess relative contributions of "midline defects" (widening of the vagina) and "paravaginal defects" (separation of the lateral vagina from the pelvic sidewall).	The lateral anterior vaginal wall margin was farther from its normal position in cases than controls throughout most of the vaginal length, most pronounced midvagina (effect sizes, 2.2-2.8). Vaginal widths differed in the midvagina with an effect size of 1.0. Strong correlations between apical and paravaginal support were evident in mid- and upper vagina (r = 0.77-0.93).	4

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
110. Alvarez J, Cvach K, Dwyer P. Complications in pelvic floor surgery. <i>Minerva Ginecol.</i> 2013; 65(1):53-67.	Review/Other-Tx	N/A	To review the complications of treatment of POP and urinary incontinence.	Long-term complications such as pelvic pain and dyspareunia may be as high as 25%. Prolapse surgery associated with mesh may result in better anatomical outcomes but this is offset by the high complication rate, particularly that of mesh exposure which has been reported to be between 3%-15%. Minimally invasive anti-incontinence procedures are associated with less morbidity than their abdominal predecessors but they are not free of complications. Complications of mid-urethral slings include those of mesh exposure (0.3%), voiding dysfunction (7%) and de novo urgency (25%). The risk and severity of complications varies depending on the procedure performed and on patient characteristics and, therefore, patients need to be informed of these risks or clinicians will be held responsible. This has never been more true than now with the debate regarding the value of transvaginal mesh and laparoscopic procedures for prolapse, their risks and potential benefits, and the associated medico-legal sequelae.	4
111. Chermansky CJ, Winters JC. Complications of vaginal mesh surgery. <i>Curr Opin Urol.</i> 2012; 22(4):287-291.	Review/Other-Tx	N/A	To review the current literature on complications seen with the use of vaginal mesh for both SUI and POP.	The use of mesh in midurethral slings results in similar efficacy but less morbidity compared with nonmesh sling techniques. The use of mesh in abdominal sacrocolpopexy may result in lower rates of mesh complications compared with transvaginal mesh prolapse repairs. In 2011, the Food and Drug Administration issued an updated safety communication stating that serious complications associated with transvaginal mesh for POP repair are not rare. Yet, certain patients do benefit from the use of transvaginal mesh for POP repair.	4

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
112. Novara G, Galfano A, Boscolo-Berto R, et al. Complication rates of tension-free midurethral slings in the treatment of female stress urinary incontinence: a systematic review and meta-analysis of randomized controlled trials comparing tension-free midurethral tapes to other surgical procedures and different devices. <i>Eur Urol.</i> 2008; 53(2):288-308.	Review/Other-Tx	33 randomized controlled trials	To evaluate the complication rates of tension-free midurethral slings compared with other surgical treatments for SUI, including other tension-free midurethral slings.	Our search identified 33 randomized controlled trials reporting data on complication rates. Our meta-analysis showed that complication rates were similar after TVT and Burch colposuspension, with the exclusion of bladder perforation, which was more common after TVT (P=0.0001), and reoperation rate, which was significantly higher after Burch colposuspension (P=0.02). TVT and pubovaginal sling were followed by similar complication rates. With regards to the comparisons among retropubic tapes, TVT and intravaginal slingplasty had similar complication rates, whereas suprapubic arc sling was complicated by higher rates of voiding lower urinary tract symptoms (P=0.02) and reoperations (P=0.04). Comparing retropubic and transobturator tapes, the occurrence of bladder perforations (P=0.007), pelvic haematoma (P=0.03), and storage lower urinary tract symptoms (P=0.01) was significantly less common in patients treated by transobturator tapes.	4

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
113. van Geelen JM, Dwyer PL. Where to for pelvic organ prolapse treatment after the FDA pronouncements? : A systematic review of the recent literature. <i>Int Urogynecol J.</i> 2013; 24(5):707-718.	Review/Other-Tx	N/A	To review recent studies of good quality on POP to assess the safety and effectiveness of treatment options and determine their place in management.	Prospective comparative studies show that vaginal pessaries constitute an effective and safe treatment for POP and should be offered as first treatment of choice in women with symptomatic POP. However, a pessary will have to be used for the patient's lifetime. Abdominal sacral colpopexy is effective in treating apical prolapse with an acceptable benefit-risk ratio. This procedure should be balanced against the low but non-negligible risk of serious complications. The results of native tissue vaginal POP repair are better than previously thought with high patient satisfaction and acceptable reoperation rates. The insertion of mesh at the time of anterior vaginal wall repair reduces the awareness of prolapse as well as the risk of recurrent anterior prolapse. There is no difference in anatomic and subjective outcome when native tissue vaginal repairs are compared with multicompartement vaginal mesh. Mesh exposure is still a significant problem requiring surgical excision in approximately $\geq 10\%$ of cases. The ideal mesh has not yet been found necessitating more basic research into mesh properties and host response. Several studies indicate that greater surgical experience is correlated with fewer mesh complications. In women with uterovaginal prolapse uterine preservation is a feasible option which women should be offered. Randomized studies with long-term follow-up are advisable to establish the place of uterine preservation in POP surgery.	4

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
114. Abed H, Rahn DD, Lowenstein L, Balk EM, Clemons JL, Rogers RG. Incidence and management of graft erosion, wound granulation, and dyspareunia following vaginal prolapse repair with graft materials: a systematic review. <i>Int Urogynecol J.</i> 2011; 22(7):789-798.	Review/Other-Tx	110 studies	To describe the incidence, risk factors, and treatments of graft erosion, wound granulation and dyspareunia as adverse events following vaginal repair of POP with non-absorbable synthetic and biologic graft materials.	110 studies reported on erosions with an overall rate, by meta-analysis, of 10.3%, (95% CI, 9.7%-10.9%; range, 0%-29.7%; synthetic, 10.3%; biological, 10.1%). 16 studies reported on wound granulation for a rate of 7.8%, (95% CI, 6.4%-9.5%; range, 0%-19.1%; synthetic, 6.8%; biological, 9.1%). Dyspareunia was described in 70 studies for a rate of 9.1%, (95% CI, 8.2%-10.0%; range, 0%-66.7%; synthetic, 8.9%; biological, 9.6%).	4
115. Haylen BT, Freeman RM, Lee J, et al. An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint terminology and classification of the complications related to native tissue female pelvic floor surgery. <i>Int Urogynecol J.</i> 2012; 23(5):515-526.	Review/Other-Dx	N/A	A report on the terminology and standardized classification for those complications related to native tissue female pelvic floor surgery by combining the input of members of the Standardization and Terminology Committees of two International Organizations, the International Urogynecological Association (IUGA) and the ICS and a Joint IUGA/ICS Working Group on Complications Terminology, assisted at intervals by many external referees.	A terminology and classification of complications related to native tissue female pelvic floor surgery has been developed, with the classification based on category (C), time (T), and site (S) classes and divisions that should encompass all conceivable scenarios for describing operative complications and healing abnormalities. The CTS code for each complication, involving three (or four) letters and three numerals, is likely to be very suitable for any surgical audit or registry, particularly one that is procedure-specific. Users of the classification have been assisted by case examples, color charts and online aids.	4
116. Haylen BT, Freeman RM, Swift SE, et al. An International Urogynecological Association (IUGA) / International Continence Society (ICS) joint terminology and classification of the complications related directly to the insertion of prostheses (meshes, implants, tapes) & grafts in female pelvic floor surgery. <i>Int Urogynecol J.</i> 2011; 22(1):3-15.	Review/Other-Dx	N/A	A report on the terminology and classification of complications related directly to the insertion of prostheses and grafts in female pelvic floor surgery by combining the input of members of the Standardization and Terminology Committees of two International Organizations, the IUGA and the ICS and a Joint IUGA/ICS Working Group on Complications Terminology, assisted at intervals by many expert external referees.	A terminology and classification of complications related directly to the insertion of prostheses and grafts in female pelvic floor surgery has been developed, with the classification based on category (C), time (T) and site (S) classes and divisions that should encompass all conceivable scenarios for describing insertion complications and healing abnormalities. The CTS code for each complication, involving three (or four) letters and three numerals, is likely to be very suitable for any surgical audit or registry, particularly one that is procedure-specific. Users of the classification have been assisted by case examples, color charts and online aids.	4

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
117. Rousset P, Deval B, Chaillot PF, Amara N, Buy JN, Hoeffel C. MRI and CT of sacrocolpopexy. <i>AJR.</i> 2013; 200(4):W383-394.	Review/Other-Dx	N/A	To describe the surgical procedure of sacrocolpopexy as well as the normal postoperative features and complications on cross-sectional imaging, with an emphasis on MRI.	Sacrocolpopexy with mesh insertion is a commonly performed operation to treat POP. Multi-detector computed tomography and MRI are used not only to evaluate for potential complications of the procedure but also to evaluate for functional disorders and recurrent prolapse.	4
118. Dietz HP, Barry C, Lim YN, Rane A. Two-dimensional and three-dimensional ultrasound imaging of suburethral slings. <i>Ultrasound Obstet Gynecol.</i> 2005; 26(2):175-179.	Experimental-Dx	182 women	To determine differences in position and mobility of these implants, and to determine whether such differences explain variations in clinical outcome.	There were no significant differences in subjective cure/improvement of stress or urge incontinence or overall subjective cure/improvement. Symptoms, including those of voiding dysfunction, did not vary between groups. All tapes could be imaged by US. TVT and suprapubic arc sling were highly echogenic, with the suprapubic arc sling generally flatter and of wider weave. The intravaginal slingplasty seemed narrower and less echogenic. Tape position and mobility were similar, with a trend towards greater distances between tape and symphysis pubis and greater horizontal tape mobility in the suprapubic arc sling group.	3
119. Giri SK, Drumm J, Wallis F, Flood H. Postoperative magnetic resonance imaging characterization of slings for female stress urinary incontinence. <i>Neurourol Urodyn.</i> 2011; 30(1):108-112.	Review/Other-Dx	60 patients	To characterize different types of slings such as autologous rectus fascia, porcine dermis and TVT in the early postoperative period with regard to its visibility and location by using MRI.	Autologous rectus fascia slings were clearly visible in both T1W and T2W images. Autologous rectus fascia appeared as low signal intensity area with surrounding high signal intensity due to fat attached to the rectus fascia in the MRI images obtained 6 hours after the procedure. Although the fatty component of the sling was diminished but was still visible on MRI scan 3 months postoperatively. On the other hand porcine dermis and TVT sling materials were not visible by MRI. Most of the autologous rectus fascia slings were located just below the bladder neck.	4

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
120. Schuettoff S, Beyersdorff D, Gauruder-Burmester A, Tunn R. Visibility of the polypropylene tape after tension-free vaginal tape (TVT) procedure in women with stress urinary incontinence: comparison of introital ultrasound and magnetic resonance imaging in vitro and in vivo. <i>Ultrasound Obstet Gynecol.</i> 2006; 27(6):687-692.	Observational-Dx	20 women	To determine whether introital US and MRI after TVT insertion can depict the polypropylene tape, and thus be used for patient follow-up.	In the phantom, the polypropylene tape was depicted with a low signal intensity by MRI and as a highly echogenic structure by US. In the clinical study, introital US in a midsagittal orientation depicted the vaginal tape in all patients: it was located under either the midurethra (n=16) or the lower urethra (n=4), and in either the muscular coat of the urethra (n=8) or in the urethrovaginal space (n=12), the tape was either flat (n=6) or curled up (n=14), and there was no retropubic visualization of the tape. Overall, depiction by MRI was limited, and was poorer in comparison with US, especially when the tape had a sub- or paraurethral location. Retropubically, however, MRI identified the tape near the periosteum of the pubic bone (55% of cases), in the retropubic space (37.5% of cases), or near the bladder wall (7.5% of cases).	3
121. Masata J, Martan A, Svabik K, Drahoradova P, Pavlikova M. Ultrasound imaging of the lower urinary tract after successful tension-free vaginal tape (TVT) procedure. <i>Ultrasound Obstet Gynecol.</i> 2006; 28(2):221-228.	Observational-Dx	52 women	To evaluate changes in the mobility of the whole urethra, in the proximal urethra (funneling) and in the thickness of the urinary bladder wall, after a successful TVT procedure.	The position of the urethra at rest was not influenced by surgery. The operation significantly decreased the mobility of all parts of the urethra during Valsalva. The absolute changes of the vector of the urethral movement differed according to the mobility group (average decrease, 6 mm; decrease for women with low, intermediate and high mobility, respectively, 2-3 mm, 4-6 mm and 9 mm). The change in relative mobility was the same in all groups. The operation decreased funneling (width and depth) during maximal Valsalva. After surgery there was an increase in the thickness of the bladder wall (by 0.64 and 0.73 mm, respectively, at the anterior part and trigone).	3
122. Rinne K, Kainulainen S, Aukee S, Heinonen S, Nilsson CG. Dynamic MRI confirms support of the mid-urethra by TVT and TVT-O surgery for stress incontinence. <i>Acta Obstet Gynecol. Scand.</i> 2011; 90(6):629-635.	Observational-Dx	42 parous women with SUI; 16 controls	To study changes in mid-urethral function with dynamic MRI in stress urinary incontinent women undergoing either TVT or TVT-obturator sling operations.	Postoperatively the women could elevate their mid-urethra by pelvic floor muscle contraction significantly higher than before the operation (P<0.05). Despite a different support angle between the TVT and the TVT-obturator mid-urethral slings, we could not see any differences in the movement patterns.	3

* See Last Page for Key

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
123. Schofield ML, Higgs P, Hawnaur JM. MRI findings following laparoscopic sacrocolpopexy. <i>Clin Radiol.</i> 2005; 60(3):333-339.	Review/Other-Dx	N/A	A pictorial review to describe the operation, show examples of normal meshes with a good result, and detail some complications which have been demonstrated on MRI.	Sacrocolpopexy is not an uncommon procedure. Open sacrocolpopexy is considered the 'gold standard'; the laparoscopic technique is less usual because of the degree of technical difficulty, but the appropriateness of MRI is the same. An MR request following a sacrocolpopexy is relatively infrequent, but there is evidently a useful role for postoperative MRI.	4
124. Carr LK, Herschorn S, Leonhardt C. Magnetic resonance imaging after intraurethral collagen injected for stress urinary incontinence. <i>J Urol.</i> 1996; 155(4):1253-1255.	Observational-Dx	32 women	MRI was performed to evaluate the results of intraurethral collagen injected SUI.	Intraurethral collagen was easily imaged by MRI and appeared as a hyperintense focus within the wall of the urethra. Neither volume nor position of retained intraurethral collagen was predictive of clinical outcome (P=0.80 and P=0.32, respectively). The volume of injected intraurethral collagen strongly correlated with the retained volume in clinically successful and failed cases (Pearson's r= 0.64 and r= 0.90, respectively). No evidence of local or remote pathological conditions resulting from intraurethral collagen injection was identified.	3
125. Poon CI, Zimmern PE, Wilson TS, Defreitas GA, Foreman MR. Three-dimensional ultrasonography to assess long-term durability of periurethral collagen in women with stress urinary incontinence due to intrinsic sphincter deficiency. <i>Urology.</i> 2005; 65(1):60-64.	Observational-Dx	54 patients	To investigate the natural history of periurethral collagen injection over time using serial 3-D US of the urethra as an objective measure.	Of the 54 patients undergoing periurethral collagen injection during the accrual period, 20 had follow-up of 1 year or longer (mean 2.0, range 1 to 3.8). The mean 3-D US collagen volumes were not statistically different at baseline at a mean of 4 months after periurethral collagen injection (2.9 +/- 1.9 cm ³) compared with at the last follow-up visit (2.7 +/- 1.9 cm ³ ; P=0.34). The volume retention rate was 97% +/- 33% of the baseline volume. The periurethral configuration was circumferential in 80% and asymmetric in 20%, and was maintained over time. The postinjection Urogenital Distress Inventory question 3 (SUI) and quality-of-life scores were significantly improved compared with the pre-periurethral collagen injection evaluations with a mean of 2.4 +/- 0.8 vs 1.4 +/- 0.7 (P=0.013) and 7.3 +/- 2.6 vs 3.5 +/- 2.5 (P=0.001), respectively.	4

**Pelvic Floor Dysfunction
EVIDENCE TABLE**

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
126. Savoye-Collet C, Savoye G, Koning E, et al. Anal endosonography after sphincter repair: specific patterns related to clinical outcome. <i>Abdom Imaging</i> . 1999; 24(6):569-573.	Observational-Dx	31 patients	To evaluate the endosonographic patterns of the anal sphincter after sphincteroplasty to define specific postoperative findings and to identify factors related to clinical outcome after sphincter repair.	Postoperative endosonograms showed specific images: direct visualization of the surgical process was represented by the "overlapping sign" in 17 cases and the "end-to-end suture" in 4 cases. These echographically favorable cases were associated with improvement after surgery in 18/21 patients (P<0.005). Persistent defects were reduced in 5 patients and unchanged in 5 other patients and were associated with poor outcome in 8/10 patients (P<0.005).	3

Evidence Table Key

Study Quality Category Definitions

- *Category 1* The study is well-designed and accounts for common biases.
- *Category 2* The study is moderately well-designed and accounts for most common biases.
- *Category 3* There are important study design limitations.
- *Category 4* The study is not useful as primary evidence. The article may not be a clinical study or the study design is invalid, or conclusions are based on expert consensus. For example:
 - a) the study does not meet the criteria for or is not a hypothesis-based clinical study (e.g., a book chapter or case report or case series description);
 - b) the study may synthesize and draw conclusions about several studies such as a literature review article or book chapter but is not primary evidence;
 - c) the study is an expert opinion or consensus document.

Dx = Diagnostic

Tx = Treatment

Abbreviations Key

CCP = Cystocolpoproctography

CI = Confidence interval

DCP = Dynamic cystocolpoproctography

EAS = External anal sphincter

EAUS = Endoanal ultrasound

IAS = Internal anal sphincter

ICC = Intraclass correlation coefficient

MPL = Midpubic line

MRI = Magnetic resonance imaging

NPV = Negative predictive value

OR = Odds ratio

PCL = Pubococcygeal line

POP = Pelvic organ prolapse

POP-Q = Pelvic organ prolapse quantification

PPV = Positive predictive value

SD = Standard deviation

SUI = Stress urinary incontinence

TVT = Tension-free vaginal tape

US = Ultrasound