

Role of Dynamic and Static MR Imaging in
Assessment of Pelvic Floor Dysfunction

Thesis

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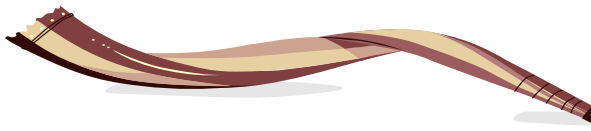
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*Soha Mohammed Gamal
M. Rabie*

Dedication



O

قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا
إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ
الْحَكِيمُ

صدق الله العظيم

سورة البقرة الآية

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Introduction

Pelvic floor dysfunction is a general term applied to a varied variety of clinical conditions; most commonly stress incontinence, pelvic organ prolapse, and anal incontinence (*Bump ad Norton, 1998*).

It affects up to 50% of middle aged and older parous women presenting with pelvic pain, pressure, dyspareunia, incontinence, incomplete emptying and gross protrusion (*Harris, 1990 and Ruch, 1995*).

Some women develop pelvic floor dysfunction so severe that they require surgery whereas exact mechanisms are subjected to depute risk factors include age, multiparity, complicated vaginal deliveries, obesity, collagen related disorders, hysterectomy and menopause (*Mouristen, 2005 and Fielding, 2002*).

In assessment of pelvic floor dysfunction MR Imaging seems to be an innovative technique that doesn't expose patient to ionizing radiation. MRI can reveal relative positions of various organs during different maneuvers. The type and the degree of anterior, medial, or posterior prolapse, and the morphology of levator ani muscle. It also medicates the presence of an incidental lesion involving the uterus ovaries or digestive tract (*Maubon et al., 2003*).

Introduction and Aim of the Study

MRI clinically is relevant in patients who complain dichasia and don't respond to 1st line of treatment, or pre-operatively when pelvic static disorder is suspected. Another indication of MRI is the global assessment of pelvic floor after urogenital surgery when new symptoms appears.

Dynamic MRI pelvic floor with fast sequences enables functional evaluation to assess pelvic floor relaxation and pelvic organ descent (*Fielding, 2003 & Kelvin and Pannu, 2003*).

Static MEI is utilized to delineate components of pelvic organs support system including anal Sphincter Complex (*Delancey, 2002 and Kim et al., 2003*).

So combined analysis of dynamic and static MRI of pelvic floor reveals that certain anatomic defects on static images are associated with specific functional abnormalities on dynamic images.

Aim of the Study

To assess role of dynamic and static MRI in pelvic floor dysfunction.

Anatomy of Pelvis and Floor

Pelvic

The female pelvis divided into three compartments supported by three components of the pelvic sling: anterior compartment (bladder and urethra), middle compartment (vagina, cervix, uterus and adenexa), posterior compartment (anus and rectum).

The pelvic floor is a complex, integrated, multi-layer system that provides active and passive support. Facia and ligaments provides passive support, while the muscles of the pelvic floor, mainly levator anai, provide active support. The facia is attached to the bone ring of the pelvis, with the ligaments formed from the facial condensation. The pelvic floor has three layers from cranial to caudal: the facial layer (endopelvic facia), the intermediate pelvic diaphragm, and urogenital diaphragm, with their associated supportive structures, which are intimately related to urogenital region, urethra, anal sphincter, and vagina in women (*Pannu, 2000*).

The Bony Pelvis:

The bony pelvis (Fig.1) consists of the 2 innominate bones, or hip bones, which are fused to the sacrum posteriorly and to each other anteriorly at the pubic symphysis. Each innominate bone is composed of the ilium, ischium, and pubis, which are connected by cartilage in youth but fused in the adult.

The pelvis has 2 basins: the major (or greater) pelvis and the minor (or lesser) pelvis. The abdominal viscera occupy the major pelvis; the minor pelvis is the narrower continuation of the major pelvis inferiorly. The inferior pelvic outlet is closed by the pelvic floor (*Soames, 1995*).

The female pelvis has a wider diameter and a more circular shape than that of the male (Fig.2). The wider inlet facilitates head engagement and parturition. The wider outlet predisposes to subsequent pelvic floor weakness. Numerous projections and contours provide attachment sites for ligaments, muscles, and fascial layers. Of note is the thin and triangular sacrospinous ligament, which extends from the ischial spines to the lateral margins of the sacrum and coccyx anteriorly to the sacrotuberous ligament (*Soamcs, 1995*).

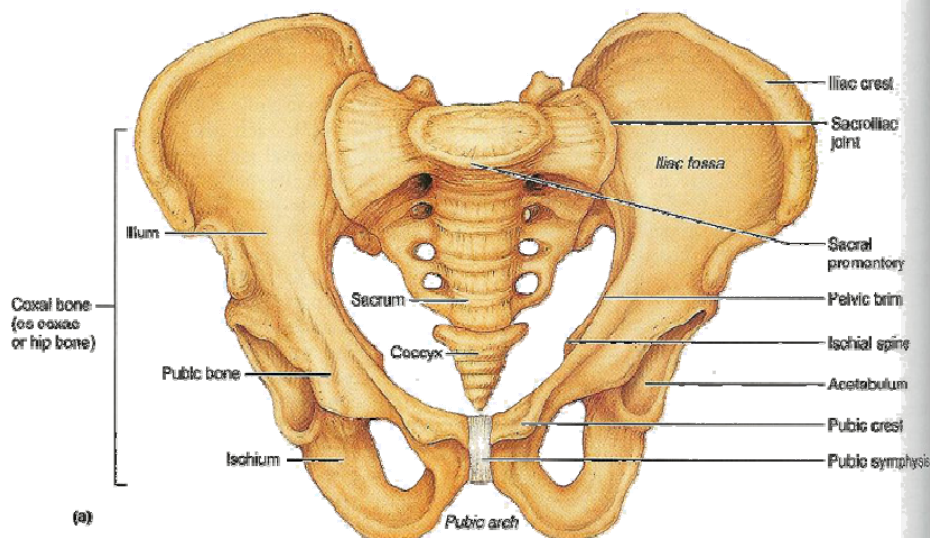


Figure (1): Bony pelvis.



Figure (2): Male and female pelvis superior view.

Pelvic Fascia:

The fascia of the pelvis may be resolved into:

- a. The fascial sheaths of the Obturator internus, Piriformis, and pelvic diaphragm.
- b. The fascia associated with the pelvic viscera.

The fascia of the obturator internus (Fig.3) covers the pelvic surface of the muscle. Above, it is loosely connected to the back part of the arcuate line, and here it is continuous with the iliac fascia.

In front of this, as it follows the line of origin of the obturator internus, it gradually separates from the iliac fascia