Review

Pelvic Floor Dysfunctions After Total Hip Arthroplasty A Narrative Review

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ABSTRACT

Pelvic floor dysfunction following total hip arthroplasty has a significant impact on patients' quality of life. Depending on the anatomical features and surgical approach, pelvic floor dysfunction such as urinary incontinence, constipation, sexual dysfunction and chronic pelvic pain may occur due to the connection of the hip to the lumbar spine and pelvis. These dysfunctions require a multidisciplinary approach, as timely and accurate diagnosis and long-term management are important. Detailed knowledge of the anatomy and structures at risk will allow early diagnosis and appropriate evaluation and management of urinary incontinence, constipation, sexual dysfunction and chronic pelvic pain that may occur before and after THA.

Keywords: chronic pelvic pain, constipation, hip pathologies, sexual dysfunction, urinary incontinence

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INTRODUCTION

Total hip arthroplasty (THA) is a successful and widely used for hip osteoarthritis, improving patients' quality of life by reducing pain and restoring function (1), with a success rate of 95% (2).

Various surgical approaches are used in THA surgery, including the posterior (PA), lateral (LA) and anterior approach (AA). Each of these approaches has its own advantages and disadvantages (3).

AA for THA has clinical advantages: muscle strength and ambulation improve early postoperatively and the dislocation risk is low (4-6). It is becoming increasingly popular as a THA approach (7). LA involves cutting the gluteus medius to gain anterolateral access to the hip joint. The risk of dislocation is lower, but there are

disadvantages such as upper gluteal nerve injury, heterotopic ossification and impaired abductor function (7). PA is a basic approach to the hip joint and is one of the most commonly used approaches in THA. In PA, the gluteus maximus is cut and the piriformis, the combined tendon of the upper gemellus, obturator internus, lower gemellus and obturator externus tendon are released from the trochanter major and the joint is exposed (8). If the piriformis and obturator muscles are not released, it may damage these muscles (especially the obturator externus) by causing excessive tension (9). This allows complete exposure of the acetabulum and femur and prevents disruption of the hip abductors. However, the PA has a higher risk of dislocation than the LA or AA (7).

Among the muscles of the lower extremities, the obturator internus, also known as the 'hidden' muscle, is one of the least recognized anatomical structures. The obturator internus, while classified as a lower limb muscle, also contributes to the structure of the pelvic wall. From an anatomical perspective, the obturator internus originates in close connection with the levator ani muscle. As a key component of the pelvic floor, the levator ani plays a vital role in maintaining support for pelvic organs. Research suggests a functional link between the obturator internus and pelvic floor muscles, indicating that movements of the hip joint can influence both defecation and urinary processes (10).

The pelvic floor is made up of muscles, ligaments, and fascia, playing a vital role in the stability and tone of the pelvic area. It supports essential functions such as bladder and bowel control, sexual health, and more. Disorders of the pelvic floor involve complex, multifactorial causes that can affect health, highlighting the importance of early diagnosis to ensure proper care and treatment (11). Pelvic floor dysfunctions that occur following THA are rare, but these disorders of varying severity negatively affect the quality of life of patients (12). These dysfunctions vary depending on anatomical location and surgical approach. Detailed knowledge of anatomy and structures at risk is important both to prevent injury and to identify the problem. The aim of our study was to investigate pelvic floor dysfunctions that may occur after total hip arthroplasty. Thus, early identification of the problem can help facilitate timely evaluation and treatment to prevent pelvic floor dysfunctions such as urinary incontinence, constipation, sexual dysfunction and chronic pain after THA.

TOTAL HIP ARTHROPLASTY AND UROGENITAL DYSFUNCTIONS

Urinary incontinence, characterized by the unintentional leakage of urine, is the most prevalent form of pelvic floor dysfunction (13). Urinary incontinence includes several subtypes, with the most frequent being stress urinary incontinence, urge urinary incontinence, and mixed urinary incontinence. Stress urinary incontinence involves urine leakage during activities that increase abdominal pressure, such as physical exercise, coughing, or sneezing. Urge urinary incontinence, on the other hand, refers to involuntary urine loss accompanied by a sudden, intense urge to urinate. Urge urinary incontinence is commonly associated with overactive bladder syndrome, which also presents with symptoms like urgency, increased frequency, and nocturia. Mixed incontinence combines features of both stress urinary incontinence and urge urinary incontinence (14-16). Additionally, functional urinary incontinence occurs when individuals are unable to reach the toilet in time due to cognitive impairments such as dementia or physical limitations, irrespective of the urinary tract's condition. Overflow incontinence, meanwhile, results from incomplete bladder emptying, leading to unintentional urine leakage due to urinary retention. The most common type is stress incontinence, which has been reported to occur in 30-40% of women aged 60 years and older (15-18). Stress incontinence is caused by a transient increase in abdominal pressure which raises the intravesical pressure to a level that exceeds the urethral closure pressure (10). Urethral closure is mediated by three structures: the pubourethral ligament, the suburethral vaginal wall hammock and the levator ani muscle. When the relationship between these three structures is disrupted, dysfunction and stress incontinence occur (19).

The levator ani contributes to both the lateral and inferior boundaries of the pelvic cavity, with the coccygeus muscle situated above it and the external anal sphincter located below. Positioned laterally to the levator ani, the obturator internus is enclosed by the obturator fascia. Anteriorly, the levator ani anchors to the pubic bone, while its posterior portion attaches to the obturator fascia. Together with the coccygeus and piriformis, the obturator internus helps form the pelvic wall. This substantial muscle spans the pubis, ischium, and obturator foramen (19). Among the external

hip rotators, the obturator internus is the largest and plays a key role in lateral rotation of the hip (10,19). The levator ani is essential for pelvic organ support and is critically involved in maintaining bowel and bladder control (18).

Research suggests a functional and physiological connection between the obturator internus and the levator ani muscles (19,20). It is thought that limitations in hip mobility can negatively affect the performance of the levator ani. Findings from a randomized controlled trials have demonstrated that targeted hip rehabilitation contributed to strengthening the pelvic floor muscles and led to improvements in symptoms of stress urinary incontinence (20,21). Other studies have indicated that enhanced hip function following THA leads to improvements in urinary incontinence (10,22-24). CT scans of patients taken before and after THA revealed atrophy of the obturator internus muscle (10). A decrease in the strength of the obturator internus muscle can result in urinary incontinence as well as weakness in external rotation. If the strength of this muscle group is restored during THA rehabilitation, it may enhance the support of pelvic organs and alleviate urinary incontinence.

Urinary retention refers to the inability to empty the bladder despite it being full. Postoperative urinary retention (POUR) is a frequent issue following hip replacement surgeries. If not diagnosed promptly, POUR can result in an atonic bladder and long-term damage to the detrusor muscle. Risk factors for the occurrence of POUR are: male gender, benign prostatic hypertrophy, or history of urinary retention, old age, use of spinal/epidural anesthesia appeared as a risk factor compared with general anesthesia. It is important that the physiotherapist and surgeon have knowledge of these issues to detect and manage (with ultrasound) of POUR, prevent additional urinary complications and to ensure early discharge from the hospital (25). Also pelvic floor exercises should be prescribed for the management of urinary dysfunctions that may occur after surgery.

The bladder is one of the most commonly injured pelvic structures during THA surgery, partly due to intermittent stretching when the catheter is not in place (26). Chronic pain, haematuria, detrusor dysfunction and recurrent infection may be seen with bladder injury. Ureteral injury and obstruction may also occur after THA. Thermal injury as a result of bone cement extrusion into the pelvis causes damage to the ureter and obstruction due to stenosis may occur (27,28). A review of the literature showed that urinary dysfunctions in patients with total hip arthroplasty may occur during and/or after surgery, even if they are not present before surgery. A multidisciplinary approach is required to manage these conditions (29,30). As physiotherapy approaches consist of pelvic floor muscle exercises, bladder training, habit modification, lifestyle adjustments, behavioral therapy, and scheduled or prompted voiding techniques (31).

TOTAL HIP ARTHROPLASTY AND CONSTIPATION

Constipation is an unpleasant problem that often occurs after THA: 65% of joint replacement patients experience some degree of constipation postoperatively (32). In the literature, 69.1% of patients reported constipation up to discharge and approximately 63% reported constipation 30 days after surgery (33). Patients with constipation after THA prolong hospital stay and even lead to readmission to the intensive care unit, increasing healthcare costs (34). Therefore, prevention of constipation after THA should be included in rapid recovery protocols, but there is insufficient evidence on what should be done for prevention. The high risk of constipation in patients after THA may be due to various factors such as opioid administration, inadequate fluid and fibre intake, preoperative fasting, advanced age and reduced mobility (35,36). Functional constipation may be due to anatomical features such as preoperative hip joint dyskinesia or inadequate muscle strength as a result of muscle damage from cutting during surgery.

Given the wide range of factors contributing to constipation, effective prevention strategies should be holistic, incorporating both pharmacological and non-pharmacological approaches alongside lifestyle modifications (35,37,38). In this regard, a thorough understanding of the hip joint's anatomy and adjacent structures is essential. The interplay between the obturator internus—a key muscle involved in external hip rotation—and the levator ani is particularly significant, as the anterior portion of the levator ani contributes to defecation. While earlier studies suggested that this part of the levator ani attaches solely to the pubic bone, more recent findings indicate an additional attachment to the obturator fascia (19,39). Consequently, assessments of anterior levator ani function should take into account

its posterior connection to the obturator fascia. This region may also be influenced by the internal and posterior segments of the obturator internus (40).

One hip movement–based approach to enhancing pelvic floor function in cases of constipation involves adopting specific body positions, with squatting being the most commonly recommended to aid defecation (41). It is proposed that increased hip flexion during squatting facilitates relaxation of the puborectalis muscle, a component of the levator ani; however, current evidence supporting this claim remains limited (40). While some studies have recommended squat position to improve defacation, one study has noted that combining hip abduction and external rotation with obturator internus activation during squatting may influence the levator ani (40,42). These observations highlight the potential role of the obturator internus in bowel dysfunction and underscore the need for further research in this area (40). In addition, a recent study established a protocol to prevent constipation after THA. A multidisciplinary approach combining; preoperative education, abdominal massage and medication has been reported to effectively eliminate postoperative constipation (43). It is thought that adding hip exercises to this protocol, particularly strengthening the obturator internus, will facilitate defecation and alleviate constipation.

TOTAL HIP ARTHROPLASTY AND SEXUAL DYSFUNCTION

Hip discomfort due to degenerative disease causes severe limitations in many areas of life, including sexual activity (44). To overcome such limitations, patients are often treated with THA. Indications for THA are increasing, particularly in sexually active young patients with high functional expectations (12).

Proximity to genitourinary structures during surgery around the hip can affect the bladder, ureter and associated plexuses. The superior hypogastric plexus, which is adjacent to the hip joint, may be damaged, especially with anterior approaches, and may cause sexual dysfunction (45). Sexual dysfunction may present differently in men and women. While erectile dysfunction or ejaculatory dysfunction is most common in men, pelvic pain, vaginal dryness and sexual reluctance are more common in women (46). In addition, the physiological response of the female anatomy to hip surgery may be different. Iatrogenic injuries that can occur during the placement of the implants used in surgery, especially the acetabular component, can cause secondary sexual dysfunction such as dyspareunia by damaging the bladder or ureter (47,48,49).

Studies show a general improvement in sexual function in patients after THA. Reduced pain, increased mobility and psychological relief have a positive effect on sexual activity (50,51). On the other hand, especially in patients who have undergone revision arthroplasty or previous pelvic surgery, the risk of genitourinary complications increases, which may predispose to sexual dysfunction (50).

There is limited data in the literature for female patients. For example, sexual function has been reported to improve after hip replacement; however, problems such as dyspareunia, positional pain, or pelvic floor dysfunction may persist (52). A study by Wuertz-Kozak et al suggested that reduced pain increased sexual desire in female patients undergoing anterior lumbar surgery and that this effect could be similarly observed after THA (53).

It has been reported that approximately one third of THA candidates are concerned about the problems they may experience in their sexual life (54,55). In addition, it should be considered that a significant number of these patients experience difficulties in sexual activity due to chronic hip pain. This difficulty plays an active role in the decision to have surgery (56). It has been suggested that sexual dysfunction should be included in the assessment parameters to determine pre- and postoperative outcomes, along with the psychological and physical impact on the patient (57).

Current literature indicates that sexual function tends to improve following THA, although the extent of improvement varies due to a range of physical and psychological factors (56,58). A notable gap exists in patient education regarding postoperative expectations, particularly in relation to the safe resumption of sexual activity. Furthermore, it is essential for orthopedic surgeons to consider not only pain relief, aesthetic outcomes, and functional recovery, but also the impact of surgery on patients' sexual health. Given that sexual activity is a natural human need with significant

implications for emotional well-being and overall quality of life, it should be an integral part of the preoperative discussion and decision-making process (43,56).

As the number of patients undergoing THA is expected to increase in the coming years, well-planned studies are needed to evaluate the impact of the surgery and approach on postoperative limitations in daily life and to provide the basis for standardised patient education and instructions for safe resumption of sexual activity.

TOTAL HIP ARTHROPLASTY AND PELVIC GIRDLE PAIN

Pelvic girdle pain is characterized by discomfort localized between the posterior iliac crest and the gluteal folds, commonly affecting areas around the sacroiliac joints and the pubic symphysis (57). The underlying causes of pelvic girdle pain are associated with hormonal fluctuations and biomechanical factors that compromise lumbopelvic stability (59).

Research indicates that pelvic stability is maintained through the coordinated action of form and force closure mechanisms (57,60). In addition to the core stabilizers—such as the transversus abdominis, multifidus, pelvic floor muscles, and diaphragm—muscles of the lumbo-pelvic-hip complex, including the erector spinae, gluteal group, iliacus, and biceps femoris, contribute to pelvic stability by enhancing the stiffness of the sacroiliac joint (61). These muscles provide indirect support through their connections to the thoracolumbar fascia and the posterior ligamentous structures of the sacroiliac region (62).

Many musculoskeletal conditions can present with posterior pelvic pain as one of the complex symptoms, making diagnosis difficult for healthcare professionals. Examples of these conditions include muscle pain related to the piriformis or pelvic floor muscles, sacroiliac joint dysfunction, and hip pathology (63,64).

Patients with hip osteoarthritis commonly report pain in the groin and along the lateral hip (65,66). A study by Lesher et al. found varying pain distribution patterns in individuals with hip pathology: 20% experienced pain radiating to the posterior pelvis and thigh, 18% had pain extending to both the posterior pelvis and groin, 12% reported pain confined to the posterior pelvis, 12% experienced pain limited to the groin, 6% had pain radiating to the thigh (including anterior, posterior, and lateral regions), 6% felt pain in the posterior pelvis, groin, and thigh, and 2% reported pain radiating from the thigh to the leg (67).

Intra-articular hip pathologies, including acetabular labral tears and femoroacetabular impingement, are known to cause pain in the groin, anterior and lateral thigh, as well as the posterior pelvis (67). A study by Nunley et al. reported similar pain patterns in 16.1% of patients diagnosed with developmental dysplasia of the hip (68).

Inguinal and posterior pelvic pain may also be seen in individuals with early intra-articular hip pathology but without significant hip deformity. Following surgical intervention in THA candidates refractory to conservative treatment, complete resolution of symptoms has been reported in 33% of patients, with a general reduction in pain (68).

However, the reduction in the force closure mechanism results in a 32-68% increase in pelvic joint mobility (69), disrupting load transfer mechanisms and overloading the pelvic muscles. Therefore, strengthening the muscles involved in the force closure mechanism after THA is one of the main strategies in the treatment of pelvic girdle pain (69). An early diagnosis and specific interventions by a physiotherapist and a surgeon may reduce the risk of functional loss and disability, thereby reducing healthcare costs.

CONCLUSIONS

Pelvic floor dysfunctions—including urinary incontinence, constipation, and sexual dysfunction—can arise after THA due to the anatomical and functional link between the hip joint and pelvic structures, particularly the obturator internus and levator ani muscles. Although often underrecognized, these complications can significantly affect quality of life. The choice of surgical approach, detailed anatomical knowledge, and a multidisciplinary care plan are essential for early identification, prevention, and management. Incorporating pelvic floor assessment and rehabilitation into

pre- and postoperative care can optimize outcomes and support long-term patient well-being. Future research should focus on standardizing evaluation and rehabilitation protocols that incorporate pelvic floor health as a critical component of recovery after THA.

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