Assessment of Sports Hernia, (Athletic Pubalgia): A Case Report

Table of Contents

1.0 INTRODUCTION

A sports hernia is not a true hernia, despite its name. It is a persistent pain condition caused by an injury (typically a tear) to the muscles and/or tendons in the lower abdomen or groin. Beginning in the early 1990s, Gilmore first mentioned "Gilmore's groin. "Inguinal disruption, athletic pubalgia, sports hernia, sportsmen's groin, footballers groin injury complex, hockey player's syndrome, athletic hernia, and pubic inguinal pain syndrome are just a few of the titles that have been used to describe this injury throughout the years. (Meyers et. al., 2008; Dimitrakopoulou, 2016). Physical therapy, medication, and/or surgery can all be used to treat sports hernias. People with a sports hernia may develop nerve irritation as a result of the injury,

which can exacerbate discomfort and sensitivity in the affected area. As previously stated, the term "sports hernia" is deceptive because no hernia is present. The phrase "athletic pubalgia" is preferred by healthcare practitioners (Cohen et. al., 2016).

Although the symptoms of a hernia and a sports hernia are similar, the discomfort of a sports hernia is caused by soft tissue damage in the lower abdomen or groin, such as a rip. Usually, a muscle or tendon is ripped. A hernia produces pain by allowing the intestine or other soft tissue to protrude through a breach in the abdominal muscle, causing a bulge under the skin. Although sport's hernia can progress to a hernia, the normal hernia is treated independently. (Elattar et al., 2016).

Players with athletic pubalgia have a weakness towards the posterior area or wall of the groin as result of imbalance of the adductor and abdominal muscles located at the pubis area. A profound groin ache results from this imbalance (Meyers et. al., 2008). Complete ripping occurs unilaterally or across the midline to the opposite side. Etiology, pathomechanics, and nomenclature, however, are all under dispute. A variety of terminologies are used to define groin-associated pain in athletes. Recently, a consensus was achieved at the British Hernia Society in Manchester in 2012 to adopt the phrase inguinal disruption due to its pathophysiology, while the Doha agreement in 2014 classified it as inguinal-related groin discomfort, a clinically based taxonomy (Balconi, 2011). Further pathologic diagnosis, such as an inguinal hernia, does not rule out the diagnosis of sports pubalgia because it is a specific anatomical injury rather than a general group of symptoms. Unfortunately, the phrases "sports hernia" and "sportsman hernia" which are often used interchangeably, and also used by professionals and in the media, have muddled the public's awareness of the intricacies and disparities between individual injuries and findings using MRI (Cohen et. al., 2016).

2.0 LITERATURE REVIEW

2.1 Epidemiology/Etiology

The most prevalent games that produce athletic pubalgia include long-distance running, soccer, kicking sports, ice hockey, lacrosse, cricket and Australian football. (Garvey et. al., 2010; Campanelli, 2014). All of these sports include repeated high-intensity twisting, cutting, kicking, or turning actions, all of which pose risk factors in athletic pubalgia cases. Generally, people who participate in sports that demand quick changes of direction or extreme twisting movements are more likely to develop a sports hernia, but you don't have to play a sport to develop one. Bones and muscles must be considered when discussing athletic pubalgia (Garvey et. al., 2010). The two femurs, the coccyx, and the sacrum are the bones to be considered. For the anatomic standpoint of athletic pubalgia, all of the muscles that link to the pubic symphysis are vital. The leg adductor muscles are discussed along with the anterolateral abdominal muscles. The adductor longus and rectus abdominis are the most significant muscles that are connected to

the symphysis for maintaining anterior pelvic stability in the sagittal plane. Specific soft tissues that are commonly affected include: i) oblique muscles of the lower abdomen. ii) tendons that attach the oblique muscles to the pubic bone. iii) tendons that attach the adductor longus/brevis to the pubic bone (Campanelli, 2014).

Athletic pubalgia affects primarily male athletes, who are typically under the age of 40. In general, we can explain it by the fact that more males participate in sports with a higher risk of athletic pubalgia. Another reason is that females have bigger and more study caudal rectus abdominis attachments on the pubic symphysis than males, which is not the case in males. A third explanation is that the female pelvis is broader and has a larger subpubic angle, which allows forces to be guided away from the pubic region more effectively. The female pelvic structure's anatomic and biomechanical differences may aid to stabilize the pubic region and reduce the likelihood of pubalgia (Campanelli, 2014).

2.2 Risk Factors

Reduced hip motions, muscular imbalance around the pelvis, and a considerable difference in length of the leg are all considered as risk factors. All these elements have the potential to alter pelvic stability, both functionally and structurally. The most significant variables in preventing the formation of first or recurring injury are rotation control and pelvic stability. Abdominal and groin straining in the past is also a known risk factor. (Garvey et. al., 2010).

2.3 Clinical Presentation

The majority of people with athletic pubalgia experience symptoms for months or years before receiving a clinical diagnosis. Activity-associated unilateral lower abdomen and anterior groin discomfort, which is a deep, acute ache that can radiate to the proximal thigh, low back, lower abdominal muscles, perineum, or scrotum, is the most common complaint among athletes. The most common complaint is a unilateral groin pain that subsides with rest but returns during activity. They also experience pain when coughing and sneezing (Larson, 2014).

Although pain can develop gradually, over 70% of athletes will link it to a specific event. This can include trunk hyperextension and/or hip hyperabduction, both of which cause higher pubic tension. Kachingwe and Grech listed five signs and symptoms that they considered to be indicative of athletic pubalgia: "a) a subjective presentations of deep groin/lower abdominal discomfort or pain, b) pain that is aggravated by specific sport exercises such as sprinting, kicking, cutting, and/or sit-ups and is soothed by rest, c) palpable tenderness over the pubic ramus at the insertion of the rectus abdominis and/or conjoined tendon, d) pain with resisted hip adduction at 0, 45 and/or 90 degrees of hip flexion, and e) pain with resisted abdominal curl-up" (Kachingwe, 2008; Ellsworth et. al., 2014).

2.4 Differential Diagnosis

Because of the intricate anatomy and overlap of symptoms across different groin injuries, diagnosing athletic pubalgia can be challenging. The clinician must also keep in mind that athletes with groin discomfort may have several diagnoses, and that the presence of one of

these associated diagnoses does not rule out athletic pubalgia (Minnich et al., 2011). Because sports hernia and other groin aches have similar symptoms, imaging scans can help rule out other possible sources of pain. Acetabular labral tears, adductor injuries, snapping hip syndromes, iliopsoas tendonitis, osteitis pubis, and femoroacetabular impingement are some of the conditions that can occur (Unverzagt et. al., 2008). A real groin hernia, genitourinary, gynecological problems, and intra-abdominal pain causes that can mimic athletic pubalgia symptoms must all be ruled out (Balconi, 2011).

The challenging diagnosis of pubalgia necessitates the use of imaging investigations. Ultrasound, magnetic resonance imaging (MRI), computed tomography (CT), herniography, and laparoscopy are all imaging studies that can aid in the diagnosis (Omar et al., 2008).

The accuracy of ultrasound in detecting a hernia in the groin is over 90%. In young males without clinical indications of a groin hernia, a dynamic ultrasonography examination can show inguinal canal posterior wall deficit. MRI can reveal anomalies in the abdomen wall's musculofascial layers, which are closely related to surgical findings of athletic pubalgia (Omar et al., 2008; Zoland et. al., 2017). Stress-related oedema within the symphysis pubis can also be seen by MRI, which is generated by an imbalance of forces and changed motion across the joint. CT scans can detect hernias and defects in the posterior inguinal wall. Herniography shows that those with athletic pubalgia have the condition. Laparoscopy is another test for detecting a sports hernia. It is an intrusive method for diagnosing pubalgia that is quite effective (Paajanen et. al., 2011). Endoscopy has the advantage of allowing a sports hernia to be corrected in the same session (Unverzagt et. ai., 2008).

2.5 Prevention

The identification of athletes at risk, the reduction of established risk variables, and the monitoring of individual training loads are all important steps in preventing athletic hernia. In order to measure isometric and isokinetic strength, screening should entail testing hip movement range. Inguinal injury can be prevented by assessing muscular balance, motor control, and flexibility. Prior to the season, abdominal-hip stability and flexibility tests are used to determine the degree of loading to be performed. Athletes who have previously experienced inguinal discomfort should be closely watched. The development of a strong and controlled single-leg stance, as well as motor straining actions for pelvic rotational control, could help to reduce burden on the structures surrounding the pelvis (Garvey et. al.,2010).

2.6 Management

- Medical and Surgical management

Before considering surgery, conservative therapy should be tried for three months. A four-week recovery period can be tried by in-season athletes. Nonsteroidal anti-inflammatories and oral steroid taper are two pharmacological options. Injections directly into the adductor longus origin and/or rectus abdominis include targeted corticosteroid or platelet-rich plasma injections. Return to sport can be tried after this rest period (Minnich et. al., 2011).

When a patient's pain persists despite physical therapy, surgical repair and examination is recommended. There are many different types of surgical treatment, making it impossible to compare results. The results of most procedures have been found to be satisfactory in the literature. Rectal abdominis fixation as well as reinforcing the posterior wall and or conjoint tendon are two principles of operative management. Laparoscopic surgery is another sort of surgical treatment. Endoscopy is used to insert a complete extraperitoneal mesh posterior to the pubic bone and/or the posterior wall of the inguinal opnening. Amore effective treatment for publagia in athletesis laparoscopic surgery when compared with nonoperative therapy, according to Paajanen et al. (2011). Within one month, the pain subsides, and 90 percent of athletes who underwent surgery are able to return to athletic activities after three months. When adductor pain and dysfunction are evident, most doctors prescribe an adductor tenotomy. Femoroacetabular surgery should also be explored if a contributory problem is identified, as previously described. A full come-back to sporting activites can be expected in six to eight weeks when an isolated repair of athletic pubalgia is perfomed and 4 months if FAI surgery is performed concurrently (Minnich et. al., 2011).

- Physical Therapy Management

For most people with athletic pubalgia, physical therapy is the first line of treatment. Treatment should, however, be tailored to the athlete's level, the amount of time before he or she is scheduled to continue playing, and the timing of the sport year (Larson, 2014).

Rest, active soft tissue mobilizations in cases of muscular stiffness, and manipulations of the pelvic joint, SIJ (sacroiliac joint), and hip joint could be helpful in reducing discomfort associated with dysfunction, as well as physical treatment (therapy) and anti-inflammatory medicine. Ultrasonic therapeutic treatments, cold pools, and deep groin massage may also be beneficial. First and foremost, motion range must be regained and enhanced. Following that, the treatment includes core strengthening activities for the lumbar spine, abdomen, and hips, as well as stretching for the adductors, hip rotators, and hamstrings. The treatment purpose is to ensure that stabilizers of pelvic and hip muscles are balanced (Ellsworth et. al., 2014).

Another important component is neuromuscular re-education, which begins with the contraction of the transversus abdominis in a controlled manner and focuses on the adductors and abdominal muscles. We include the gluteal and pelvic musclesas well as the multifidi as a posture stabilizer once the TA (transverse abdominis) contraction is under control. To reestablish this balance, it's also vital to train the adductors in open and closed chain exercises that improve proprioception and co-contractions with the postural muscles. Autogene stretching has two benefits: it loosens up stiff muscles and improves proprioception. The patient's reintegration into athletics and daily activities requires coordination and stabilization. The cardiovascular endurance of any patient, especially athletes, must be maintained or improved during the revalidation process (Ellsworth et. al., 2014). As a result, each session can be started with some cardiac activities. Physiotherapy treatment with active training is better than carrying

out such physiotherapy while not actively training (Larson, 2014).

3.0 A CASE REPORT

3.1 Patient's History

This is a case of a professional soccer player who is 29 years old, position defender, who suffered a groin strain while playing in a game. The patient had been playing professionally for his foreign club for 5 years at the time of the injury. Before this incident, there was no history of inguinal injuries. The injury occurred roughly halfway through the game. While receiving a quick ball from a defender, the player executed an aggressive 180-degree spin, shifting his weight to his right leg. As his weight was moved to his right leg, the player's trunk was driven into extension, which was ensued extension and abduction of the left hip.

3.2 Subjective and Objective Findings

During the examination, the patient stated that all activities, including basic trunk mobility such as bending, walking, or turning, caused substantial lower right inguinal discomfort. The patient walked with a flexed trunk and had trouble shifting from sitting to supine. Ecchymosis, on the other hand, was not present over the thigh area. With exercise such as hip flexion and trunk flexion, the patients' resting pain level was assigned a rating 3/10, and 8/10 respectively. Physical examination revealed that the active range of motion of the trunk was reduced by pain, and the range of motion of the right hip was considerably restricted in all planes of motion by intense abdominal pain. Pain in the inguinal ligament area and the right adductor longus tendon limits hip strength in flexion and adduction, pain with attempted curl up test, pain with palpation of the left lateral rectus abdominis border, pain with palpation of the left lateral rectus abdominis border, pain with palpation of the left lateral rectus abdominis border, hernia is not palpable. An MRI showed no significant abdominal or adductor anomalies, as well as no illness in the pubic symphysis.

There were additional X-rays, ultrasounds, CT scans, and bone scans performed, but no clinically significant results were found.

3.3 Diagnosis

A diagnosis of athletic pubalgia was made, and the decision to treat the subject non-operatively was also made based on physical findings, insignificant MRI results, and the physician's and medical staff's experience, with the patient's consent to administer non-invasive treatment methods as a case study to determine effectiveness.

3.4 Action Plan

The rehabilitation program is outlined in three sequential stages: Stage 1: Pain management and the start of the stabilization process. Stage 2: Strength and stability development. Stage 3: Functional exercises and return to sport.

The subjective and objective findings of the patient were utilized as a guide to gauge progress

between stages. The visual analog scale (VAS) was used for pain assessment and a goniometer was used to assess the ROM (range of movement) of the hip internal and external rotation. The patient was asked to rate their pain on a scale of 0 to 10, with 0 representing no discomfort and 10 representing the most severe pain they had ever encountered.

At the conclusion of the treatment, the outcome measures of appropriate therapy were analyzed. Successful treatments included no pelvic girdle pain after or during athletic exercise in the same sport yet at the same level of competition as before the onset of a groin pain, no pain during active adduction against tension, no groin pain during or after athletic exercises in the same sport and at the same level of competition as before the onset of the groin pain, and revert back to same sport and level of competition without groin pain.. The result was fantastic if all three criteria were met; it was good if two criteria were met; it was fair if one of the criteria was met; and it was horrible if none of the requirements were met.

A detailed active rehabilitation program implemented at each stage of the treatment, together with the duration of each stage is shown in table 1.

3.5 Treatment Outcomes

The following treatment outcomes were achieved after implementation of each stage of the active rehabilitation program.

- **Step 1: Pain management and the start of the stabilization process**

Following Stage 1 of rehabilitation, pain was assessed 0/10 or no discomfort at rest and 3/10 during moderate-intensity exercises such as treadmill jogging, trunk stabilization, and biking. Palpation of the left adductors produces no discomfort, while palpation of the right lower abdominal region produces minimal pain. The resisted abdominal crunch test revealed discomfort in the left lower abdomen region (single repetition). Pelvic posture and SIJ mobility were revealed to be WNL after special testing. The first stage of therapy took two weeks to complete.

- **Step 2: Strength and stability development**

The athlete's pain level was scored at 0/10 at rest (absence of pain) and 1/10 during moderate/high-intensity exercises such as trunk stabilization, running, and biking after Stage 2 of his rehabilitation. With abdominal crunches, there was no soreness over the adductors or the right lower abdomen region. The trunk's ROM was WNL in all planes, including extension, and the left hip's ROM was WNL in all planes.

The strength of the manual hip was 5/5 in all groups with hip muscles, which also includes the adductor muscles. The external and internal obliques, as well as the rectus abdominis, all received a top score of 5/5. As per a pressure feedback evaluation, using the transversus abdominis in supine, the subject could control and contract the trunk thereby maintaining a neutral pelvis position while conducting upper extremity bending in tune with lower extremity extension with a resistance band. The therapist used tactile assessment to aid in the assessment of abdominal efficiency during weight-bearing exercises. Despite the fact that this

manual palpation is a subjective evaluation, I found it to be beneficial in measuring abdominal activity during upright movement activities. This stage of therapy took four weeks to complete.

- Step 3: Functional exercises and return to sport

There is no pain when the adductor tendons and insertions located at the pubic bone are palpated, there is no pain during active adduction against resistance, there is no pain in the groin during or after athletic activity in the same sport and at the same level of competition as before the onset of the inguinal pain, and there is no groin pain when returning to the same sport and level of competition. It took 2 weeks to complete this final level.

4.0 DISCUSSION AND CONCLUSION

Athletes who participate in sports that require a lot of kicks and twisting are more likely to develop sports hernias (Becker et. al., 2014). The specific path of sport hernia formation is unknown, however it is suspected that a variety of variables, including hip adductors and abdominal muscular power imbalances, hip ROM impairment, and absence the flexibility of hip adductors due to recurrent shear pressure on their pelvic attachments, play a part. (Hopkins et. al., 2017). In most cases, sports hernias are part of a much larger and more complicated inguinal disruption injury. Furthermore, hernias in sports can be as a result of a variety of factors, which can influence the choice of an appropriate conservative treatment.

Imaging investigations, such as MRI, now allow for direct viewing and assessment of the pubic region's anatomic features. This has completely changed the treatment strategy and enhanced the athlete's outcomes. They can also be used to rule out and diagnose other injuries or diseases, such as a labral tear in the hip, which is sometimes mistaken for a sports hernia.

In conclusion, active exercises were found to be an important aspect of sports hernia therapy. Sports hernia management was successful with an active rehabilitation program, which resulted in less pain and a return to sports.

APPENDICE

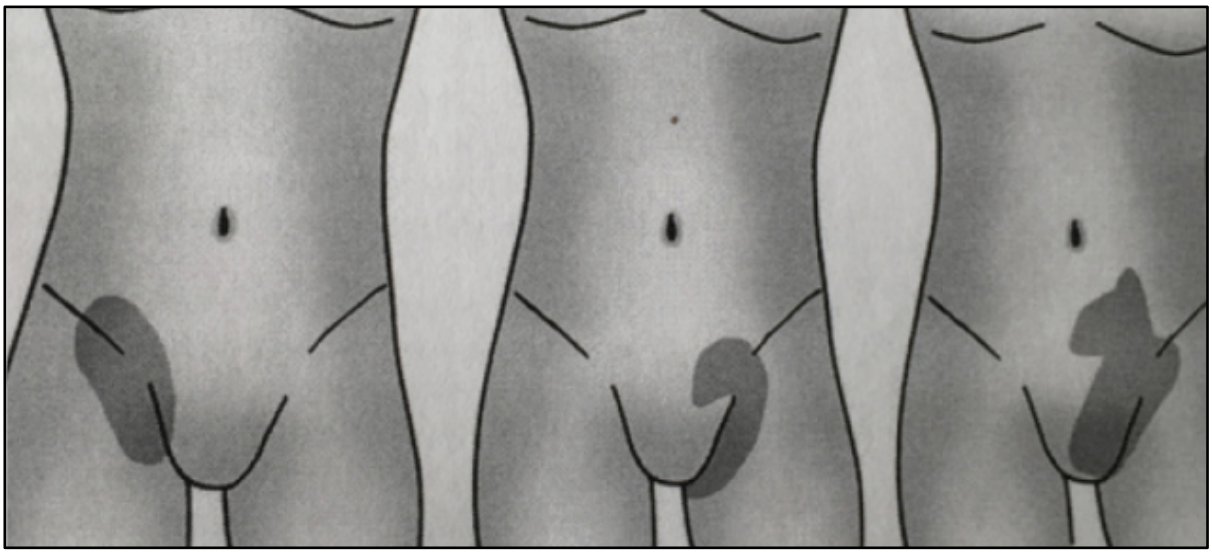

Figure 1. Pain zones in sports hernia

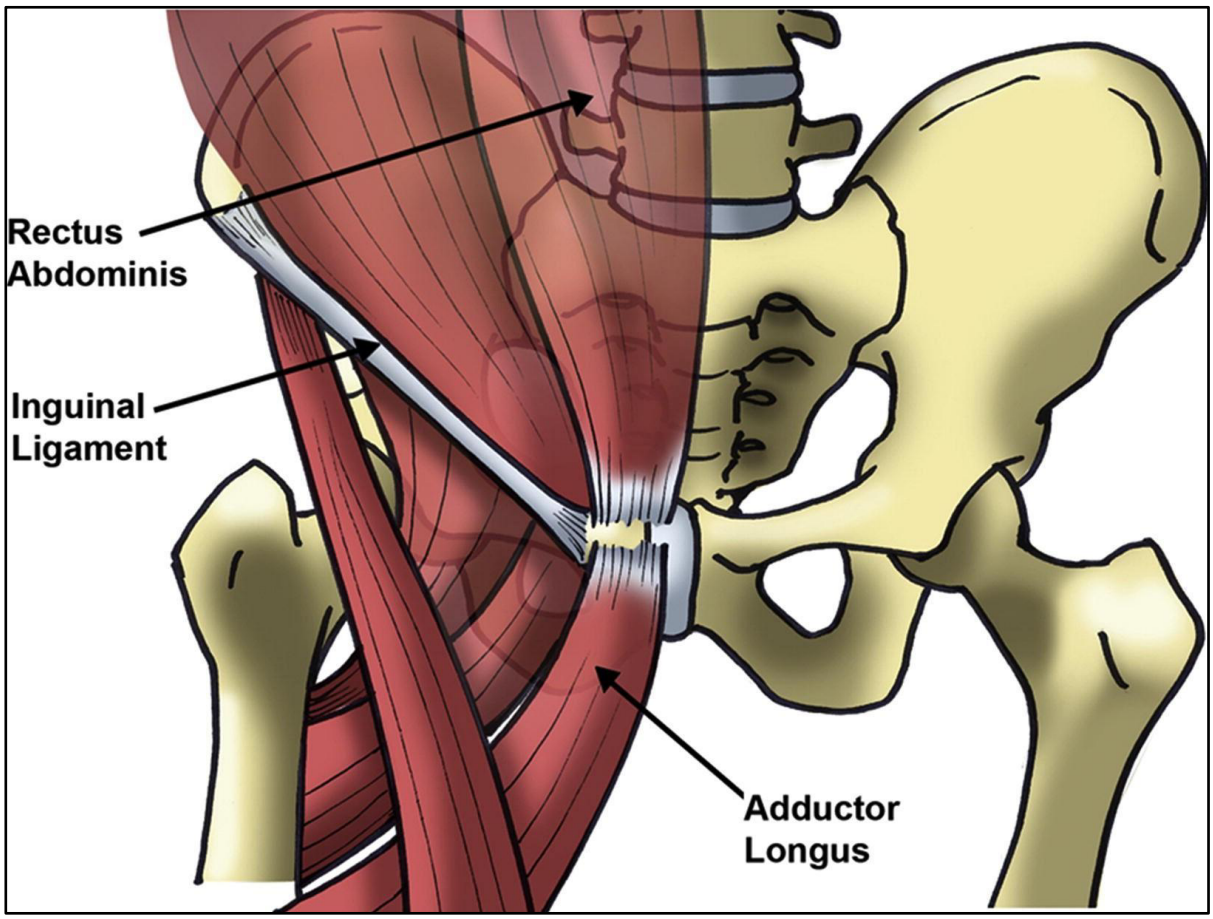

Figure 2. Affected muscles in sports hernia

Table 1. Rehabilitation program

Stage 1: 1-2 Weeks	Stage 2: 2-6 Weeks	Stage 3: 6-8 Weeks
a. While resting supine, static adduction should be performed against a football positioned between the feet. For	**a.** Warm up your heart and lungs by riding a bike or using an elliptical machine. **b.** Lying on your side, perform leg abduction and adduction exercises.	**a.** Increase the pace and resistance on a bike or elliptical for a cardiovascular warm-up. **a.** Clam exercise: the patient lies on their side with the concerned hip in thirty

each adduction activity, thirty seconds is required and the process is repeated ten times. **b.** Supine static adduction should be performed against a football positioned between the feet. For each adduction activity, thirty seconds is required and the process is repeated ten times. **c.** Pelvic tilting to the back. **d.** Using the floor as a bridge. Five sets of ten repetitions each. **e.** Sit on the ball with your pelvis and knees at ninety degrees and your hands placed on your thighs, attempting to ensure that the hip and trunk is stabilized. **f.** Abdominal sit-ups in a straight and slanted manner. 5 sets of ten repetitions each. **g.** Starting in a supine posture and with a soccer ball between knees, completing a combination of pelvic flexion and abdominal sit-up (folding knife exercise). Five sets of ten repetitions each. **h.** 5 minutes of wobble board balance training.	Each exercise is repeated five times in a row for a total of ten repetitions. **c.** Weight-pulling abduction/adduction standing on one leg. For each leg, perform five sets of ten repetitions. **d.** Performing abdominal sit-ups in a straight and slanted manner. 5 sets of 10 repetitions each. **e.** Physio-ball bridging: positioning a physio-ball underneath your legs and applying earthward pressure to the ball as your legs are flattened, thereby allowing your hip to lift from the surface. **f.** To Sit on the ball with the upper extremity on the opposite side thereby applying pressure that opposes the lifted knee while the upper extremity of the other side is lifted in the air to add a stabilized challenge. **g.** Hip extension with quadriped hips and a neutral spine. Two 15-repetition series. **h.** Quadriped with neutral spine, to alternate opposite leg and arm extension. Two 15-repetition series. **i.** With disturbances, half-kneeling. For each limb, do three sets of 30–60 seconds. **j.** Medicine ball raise and forward/backward walking lunges 2–3 sets of ten to fifteen backward. **k.** Singular balancing of the leg on a 360° balance board with flexed pelvis and knees.	degree flexion, externally abducted and rotated. Isometric contractions are performed with a resistance band. Five sets of ten repetitions each. **c.** Leg pulley adduction from a standing position. Standing next to the machine, attach the cable to your ankle and do an adduction movement. For a total of ten repetitions, perform five series. **d.** Lifting the lower extremity with bridging: the patient will be on the ball and elevate one leg into the air while ensuring the knee is extended and that the trunk is stable. **e.** Front planking: aligning the shoulders with elbows and elevating it into forearm plank while maintaining hip alignment, then proceed to hands alignment with shoulders and fingers pressing into the surface while keeping pelvis aligned. **f.** Side plank: Lie on your side while aligning your elbow, ankle, shoulder, and pelvis before rising into a plank position while ensuring alignment is maintained. **g.** Pelvic stability on an unsteady surface: the patient will be required to sit on an air-filled balancing disc while maintaining balance lifting one leg toward the chest, then with both knees. The drill should be repeated while tossing the ball **h.** Medicine ball raise and forward/backward walking lunges tw to three sets of ten to fifteen thrust forward and 10–15 lunges backward. **i.** Tossing the ball with Singular balancing of the leg on a 360° balance board with flexed pelvis and knees.

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