

# Multiple muscle tear after fall on buttock-role of conservative management and exercise for early recovery and return to play

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## Summary

**Background:** to describe role of alternative management as an approach to management and rehabilitation of multiple hip muscles tears by the use of 1 RM (Repetition Maximum) testing and hip muscle strengthening program along with the use of sports specific drills for rehabilitation and recovery.

There is very limited literature describing multiple hip muscle tears and the conservative management of the same. 1RM testing and strengthening of hip muscles is an approach that is able to help in the return to sports of an athlete without surgical intervention.

**Methods:** the patient, is a 21-year-old male hockey player who presented with pain right buttock, right lower leg and a limp on the right side while walking. Physical examination revealed a positive Trendelenburg sign both in stance and gait phase. Hip rotational movements showed a normal range of motion, there was a severe pain in the right buttock on movements which he described at 8/10 on VAS (Visual Analogue Scale). Strength assessment revealed weakness of the right hip flexors and extensors and also of the abductor and external hip rotator muscles. Treatment protocol followed was based on 1 RM testing of muscles and hip strengthening exercises and sports specific drills.

**Results:** following the intervention, the patient reported pain at 0/10 VAS while doing all activities and also showed good muscle control with no limp.

**Conclusions:** this highlights an alternative protocol for treating multiple hip muscle tears and illustrates the importance of 1 RM testing as a part of examination and sports medicine intervention.

**KEY WORDS:** buttock pain, hip pain, 1RM, multiple muscle tear.

## Introduction

There are total of 27 muscles cross the hip joint. Musculotendinous injuries are one of the most common form of sports related injuries to the hip and pelvis<sup>1</sup>. The glutei are a very important and powerful muscle group of the body, playing a role in stabilizing the ipsilateral hip by stabilizing femoral head in the acetabulum<sup>2</sup>. Power to accelerate from the standing position, jumping and pivoting all require extreme control by the glutei. The iliopsoas muscle is one of the largest and most powerful hip flexors, it is actually a combination of the iliacus and psoas muscle<sup>3</sup>. The piriformis muscle is a flat, pyramid shaped external rotator, weak abductor and weak flexor of the hip, providing postural stability during standing and walking<sup>4</sup>. Myotendinous strains are clinically divided as first grade (Stretch /strain injury), second grade (Partial Tear), and third grade (Complete tear): there are new proposed classification depending on anatomical site of injuries at MTJ<sup>5,6</sup>. Medical management of multiple muscle rupture is reported in literature: this includes injections<sup>7</sup>, of nonsteroidal anti-inflammatory drugs and muscle relaxants, surgical release, and referrals for physical therapy. The most commonly reported physical therapy interventions include ultrasound, soft tissue mobilization, piriformis stretching, hot packs or cold spray, and various lumbar spine treatments<sup>5,7</sup>. Gluteus medius and gluteus minimus tear are now also being treated endoscopically<sup>8</sup>. The interventions described in this report focused on functional exercises aimed at strengthening the hip extensors, abductors, and external rotators, as well as confidence building and other psychological support. In this respect, we feel that the main muscles were the glutei and the piriformis. Glutei are strong hip extensors and external rotators, the upper part of this muscle also functions as hip abductor<sup>9</sup>. Focusing more on

1 RM testing and controlled strengthening exercises we achieved remarkable results in this athlete. The purpose of this report is to describe an alternative approach towards the management of multiple muscle tear of the hip that emphasizes hip muscles and lower leg muscle strengthening using 1RM measurements.

### **Description**

The patient was a 21-year-old male who worked in a Bank and was a Junior National Level Hockey Player. Apart from his current complaints he had no past significant medical and surgical history.

### **History of presenting condition**

The athlete with history of fall on buttock while playing hockey match, seen by an orthopaedic surgeon and given the diagnosis of sciatica, multiple hip muscle tears and sacroiliitis and he had a complete workup done for tuberculosis of spine. The patient had undergone extensive workup in the eleven months preceding his reporting to our centre, which included X-Ray hip joint and lumbar spine; these showed no pathology, he was advised complete bed rest and treated with physical modalities like ICEing and interferential heat therapy, he was on bed rest for 5 months but did not get appreciable relief from pain and was advised MRI hip, the imaging showed 2<sup>nd</sup> to 3<sup>rd</sup> degree tears of the piriformis, iliopsoas, gluteus medius and gluteus maximus at their origin, with associated sacral oedema. He was managed with NSAIDs, Interferential Therapy and rest and use of walker for walking to minimise weight bearing. There was no significant relief following the treatment and he was advised bone scanning (99Tc MDP-3 Phase), which was indicative of sclerosis of right iliac bone and articular margin erosion of sacroiliac joint (SI joint). He once again underwent extensive work up in a tertiary care centre mainly to rule out infective pathology because of the sustained pain over ilio-lumbar area and ischial tuberosity, investigations revealed ESR ranging from 34-50 mm fall in 1<sup>st</sup> hour, positive C-reactive proteins, negative HLA B27, IgG and IgM antibodies for tuberculosis were not detected, thyroid scan and electrolytes phosphorus were within normal limits.

Since he was continuing to have pain and there was no symptomatic relief it was considered to add intra-articular corticosteroid injections to the treatment protocol. At this juncture he requested for a review opinion and reported to our Sports Medicine Centre and Clinic.

### **On examination**

At the time of reporting to our clinic he was limping and physical examination revealed a positive Trendelenburg sign both in stance and gait phase. Hip rota-

tional movements showed a normal range of motion with mild groin pain but there was severe pain in the right buttock. He described the pain as 8/10 on VAS<sup>9</sup>. Trunk flexion and extension movements in standing position were limited due to pain, the pain was radiating towards the gluteal region. He had adequate abdominal muscle control. Muscle power testing of the gluteus medius, gluteus minimus (lying on the side and doing leg abduction with hip in extension) and psoas muscle (Thomas test) revealed decreased power on the right side, the power was Grade – IV and there was associated pain on doing these movements. The Flexion Abduction Internal Rotation (FAIR) test was Positive. Piriformis muscle stretch was painful and slump test was negative. The tests on the left side revealed no abnormality and the power was Grade – V.

Neurodynamic testing<sup>10</sup>, was performed. Reproduction of buttock pain occurred at 60° of hip flexion during the straight leg raise test. Assessment of the straight leg raise test with ankle in dorsiflexion resulted in reproduction of lower back, buttock, and posterior thigh pain, with only 20° of hip flexion. Symptoms resolved with ankle plantar flexion. Soft tissue palpation revealed tenderness of the piriformis muscle and trochantric bursa. On palpation there was tenderness over right buttock, lateral to posterior iliac spine. The sacroiliac joint was assessed using a cluster of tests, as described by Laslett<sup>11</sup>. All tests were negative.

### **Test and measures**

The patient completed a Visual Analogue Scale (VAS), where 0 is no pain and 10 is the maximum tolerable pain possible, to assess his current level of pain<sup>9</sup>. The patient's baseline pain in his buttock and posterior thigh was 8/10 and reached a level of 10/10 after walking of 50 meters. Prior to treatment, the patient completed the Lower Extremity 1 RM testing. We did 1 RM testing for the muscles of the right and left limb including muscles used for hip flexion and extension. And this revealed that the 1 RM strength of right quadriceps and hamstrings, right hip extensors and flexors was considerably lower than that of the left side. Trendelenburg's test was positive, FAIR (Flexion Abduction and Internal Rotation) was positive. SLR right side was 40 degree. In addition patient had a limp while walking.

### **Investigations**

The patient had undergone extensive workup in the past 11 months, which included X-Ray hip joint and lumbar spine which showed no pathology, MRI hip, the imaging showed 2<sup>nd</sup> to 3<sup>rd</sup> grade tears of the piriformis, iliopsoas, gluteus medius and gluteus maximus at proximal MTJ<sup>6</sup> with associated sacral oedema. Bone scanning (99Tc MDP-3 Phase), which was indicative of sclerosis of Right iliac bone and articular margin erosion of sacroiliac joint (SI joint), ESR rang-

ing from 34-120 mm fall in 1<sup>st</sup> hour, positive C-reactive proteins, negative HLA B27, IgG and IgM antibodies for tuberculosis were not detected, thyroid scan and electrolytes Phosphorus were within normal limits.

### Assessment

On the basis of patient complaints, history, investigations and our examination it was revealed that he was suffering from multiple hip muscle tears grade 2 Iliopsoas, Piriformis muscles and grade 3 gluteus medius and gluteus minimus, accordingly new classification<sup>6</sup>. Gluteus muscle tear at proximal MTJ with sclerosis of Right iliac bone and articular margin erosion of sacroiliac joint (SI joint). He was having weakness of the hip extensors, abductors, external rotators and decreased strength of the quadriceps and hamstring group of muscles of right leg. We believe that positive Trendelenburg sign<sup>12</sup> both in stance and gait phase was due to weakness of the hip musculature.

### Treatment

Important factor in conservative management is patient information and education which involves providing accurate information to patient regarding the cause of their problem and recommended methods of symptom control<sup>11</sup>. The patient treatment protocol focused on strengthening the hip musculature, hip abductor, extensor and external rotator as well as quadriceps and hamstring muscles. All exercises were based on 1 RM testing and carried out in four phases. The patient was given a home exercise program that he was instructed to perform once every day other than; observed Strengthening program at the centre 5 days in week. First phase of exercises consisted of 50% of 1RM and stretching and simultaneously brisk short distance walks were started. The patient was reviewed after every 1 weeks and there was a noticeable reduction in his symptoms with a marked improvement in his gait and disappearance of the limp in the 1<sup>st</sup> phase. There was also an improvement in the muscle strength of the right lower limb, the power was tested and found to be Grade – V with a pain free range of motion. In phase two jogging, slow continuous running, short sprints and sports specific drills like zig-zag running, agility runs at a slow pace was included. At end of phase four (12 weeks) he was found to be asymptomatic and was able to participate in the National training camp he was advised to continue with his strengthening exercises and sports specific drills.

### Outcomes

The patient was re-evaluated 12 weeks after the initiation of treatment. All post treatment assessments were performed as described above. Pain he reported a 0/10 on VAS in his buttock and posterior thigh

during daily tasks, and while participating in his sporting activities. The patient reported that he was able to return to playing field hockey without limitation. SLR test was negative, FAIR test was negative, Trendelenburg test was negative and there was no limping. Re-evaluation of hip muscle performance revealed improved strength of the previously tested hip musculature, there was a significant improvement in strength of all muscle groups.

### Follow-up

The patient was contacted every 6 month following completion of phase 4 to assess his functional status. He reported that he remained pain free and continued to participate in all physical activities, he was in the national hockey team and after 2 yr he is still playing from the state in all hockey league and national and international competitions.

### Discussion

The purpose of this study was to describe an alternative treatment approach for multiple muscle tears focusing on hip muscle progressive strengthening. Some of the authors have concluded that not all of them need to be surgically repaired<sup>13</sup> literature offers no mechanism as to why strengthening would be effective. After a review of the published literature, no studies were found that mentioned a proposed mechanism of injury or treatment approach. The current report suggests that multiple hip muscle tears can be managed with progressive strengthening of muscles. During the past several years there has been limited literature describing MR and ultrasound diagnosis of gluteal strains or tears, Bird et al. found 46% of 24 patients with chronic buttock pain and symptoms ranging from 1-5 years to have a gluteus muscle tendon tear visualised on MRI, the Trendelenburg test to be the most sensitive and specific physical test for this condition. Other studies report surgical repairs<sup>14</sup> of some tears but not all authors agree on that and some have concluded that all tears need not be surgically repaired. Little has been written regarding the non surgical treatment involving exercise, strengthening and rehabilitation for management of gluteal muscle tears. Bewyer and Bewyer<sup>15</sup> reported a recommended treatment protocol and algorithm. A musculo-tendinous lesion of the iliopsoas muscle is a rare pathology and is seldom described in literature<sup>16</sup>. The cause of the lesion is usually attributed to a badly controlled eccentric contraction. Clinical examination revealing limping and impairment of hip flexion in about 30% of the cases while normal hip mobility with groin pain has also been reported in cases with iliopsoas injury. Iliopsoas injuries are generally considered uncommon<sup>17</sup>. Usually a 2-3 weeks relative rest from sport is advised. The piriformis muscle is one of the external rotators of the hip and leg. Problems of the piriformis muscle can manifest as problems of the sciatic nerve, which lies in

close proximity. Sacroiliac sprains are characterised by pain over the sacroiliac joint. These sprains occur when the strength and integrity of the anterior/ posterior sacroiliac, interosseous and sacrotuberous ligaments are overcome by sudden and forceful movements such as hamstrings contraction and trauma to the buttocks. Symptoms can resolve with conservative management. Our patient reached his goal of returning to his prior level of sport involvement with no complaints of pain during or after his hockey game. In addition to the cessation of his buttock and thigh pain, the patient reported full resolution of his low back pain.

## Conclusion

Methodological and systemic approach to this patient of<sup>18</sup> multiple tears of the hip muscles like the we are presenting, which had tears of the piriformis, gluteus medius, gluteus minimus, iliopsoas associated with sacroiliac joint sprain are very rare and little literature is available on these injuries. This was a unique of case that was managed conservatively using a good strengthening and rehabilitation programme which yielded good results with the patient showing complete and early recovery and return to play. Thus the role of a good strengthening programme in the management of such injuries is highlighted an alternative to surgical repair.

## Contributors

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