

# Modified Minimally Invasive Ilioinguinal approach to the Acetabulum Fracture

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## Abstract

**Introduction:** The ilioinguinal approach is the most commonly utilized approach for fixing fractures of the acetabulum. Letournel et al described the classical ilioinguinal approach in 1960 and it has been in use for fixation of a subset of acetabular fractures since long. **Methods:** We present a minimally invasive modification of the same approach in which fixation is carried out using only two windows as compared to the classic three window approach. The modified minimally invasive approach was used to fix 12 patients of fracture acetabulum requiring anterior exposure during a one year period starting from 1 Jan 2012 to 31 Dec 2012. The iliac vessels and nerves are protected thereby requiring no preparation of the neurovascular bundle. **Result:** There were no incidences of vascular injury or inguinal hernias. None of the patients had implant failure or surgery for removal of implants. As compared to the classical ilioinguinal approach there was less time required for exposure. **Conclusion:** The classical ilioinguinal approach and its various extensile approaches have been used to improve direct visualization and reduction of acetabulum fractures. In many of the fractures the complete exposure is not required for accurate reduction and fixation which has led to the development of newer less invasive approaches. The modified minimally invasive ilioinguinal approach can be used to fix most of the simple fractures.

**Key words:** Minimal invasive, Acetabulum fracture, New approach, Ilioinguinal approach

## Introduction

Letournel [1, 2] described the classical ilioinguinal approach in 1960 and it has been in use for fixation of a subset of acetabular fractures since that time. The approach helps to completely expose the pelvic ring from the Sacroiliac joint to the pubic symphysis. After extensive use of the same approach for many years and reviewing recent literature [3- 5] and studies regarding minimally invasive approaches we started using a modified minimally invasive version of the ilioinguinal approach for anterior exposure of the acetabulum as we found that certain type of acetabular fractures did not require the complete exposure for reduction and fixation. The classic approach has its fair share of described complications like lymphatic edema, arterial thrombosis, hernias, and nerve injuries. To decrease these complications we decided to switch over to a minimally invasive approach.

This study was carried out from a general surgeon's point of view and outcome.

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## Methods

The modified minimally invasive approach was used to fix 12 patients of fracture acetabulum requiring anterior exposure during a one year period starting from 1 Jan 2012 to 31 Dec 2012. In our institute the approach was routinely done by a team consisting of a combination of a general surgeon for exposure and an orthopaedic surgeon for fracture fixation.

## Surgical procedure

All patients were positioned supine on a radiolucent operating table. No patient was put on a traction table. Routine antibiotic prophylaxis consisted of using a broad spectrum cephalosporin antibiotic administered before surgery and continued for a period of 72 hrs. post surgery. All patients were operated using a two window technique instead of the classical three window technique of Letournel [1, 2]. The lateral window along the iliac crest was the same as that for the classic window. The middle window of the classic approach exposing the iliac vessels and nerves was not developed. The medial window was a modification of the pfannenstiel approach in which the skin incision was transverse; however the rectus muscle

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was not divided transversely. Instead the plane was developed between the two rectus abdominis in a vertical manner and thus exposing the pubic symphysis. The iliopectineal fascia was detached using finger dissection thus developing a tunnel behind the rectus abdominis muscle and the iliac vessels along the pubic ramus.

The two windows were easily connected and a plate could be easily inserted spanning from the sacroiliac joint to the pubic symphysis along the pubic ramus. In no case was the inguinal canal opened. After adequate reduction of the fractures they were fixed with reconstruction plates

and screws. The closure of both the windows was done over drains in layers which were kept for a period of 48 hrs postoperatively.

All patients were kept non weight bearing for a period of 6-8 weeks postoperatively; however they were allowed bedside physiotherapy and ambulation on the opposite unaffected lower limb with the help of a walker.

They were allowed gradual unassisted ambulation in a phased manner progressing from walker to stick to unassisted walking.

**Evaluation**

All patients were followed up at 1, 2, 4, 6, 12 months interval. They were clinically evaluated using the modified Merle d'Aubigne and Postel score [6] which consists of a total of 18 points were 6 points each are given for pain, walking and range of movement. The radiographs were evaluated for arthritis, joint space narrowing, osteophytes and wear of the acetabulum and femoral head.

**Characteristics of patients treated by the modified minimally invasive ilioinguinal approach**

Patient	Age	Gender	Fracture	Injury	complication	modified Merle d'Aubigne Score	Outcome
1	35	Male	T-shaped	RTA	None	18	Excellent
2	25	Female	Ant column	RTA	None	18	Excellent
3	64	Male	Both column	Fall from height	Arthritis	11	Poor
4	40	Male	Both column	RTA	None	18	Excellent
5	52	Male	Ant column Post hemi transverse	Fall from stairs	None	15	Good
6	56	Female	Both column	RTA	Lat Cut N Palsy recovered	16	Good
7	34	Female	T-shaped	Fall from height	None	18	Excellent
8	59	Male	Ant column Post hemi transverse	RTA	Arthritis	13	Fair
9	27	Male	Transverse	RTA	None	15	Good
10	41	Male	Transverse	RTA	None	18	Excellent
11	25	Male	T-shaped	Fall from stairs	None	18	Excellent
12	27	Female	Ant column	Fall	None	18	Excellent

**Average 16.3**

## Results

This modified minimally invasive approach was used in 12 cases of fracture acetabulum requiring fixation using the ilioinguinal approach as classified by Judet [7]. There were no incidences of vascular injury or inguinal hernias. Transient paresthetica was observed in one case. None of the patients had implant failure or surgery for removal of implants. Two patients developed arthritis and one patient developed lateral cutaneous nerve palsy which was recovered. As compared to the classical ilioinguinal

approach there was less time required for exposure as well as the amount of blood transfusion required was between 0-2 units. Only one patient required 2 units of blood. The mean modified Merle d'Aubigne at one year follow-up was 16.3 (range 11 to 18).

There were no cases of infection in the study group. Seven patients had excellent outcome, 3 patients had good outcome, one patient had good outcome and one patient had poor compared as shown by modified Merle d'Aubigne and Postel score [6].

## Discussion

The classical ilioinguinal approach and its various extensile approaches have been used to improve direct visualization and reduction of acetabulum fractures. Letournel [1, 2] described the classical ilioinguinal approach in 1960 and it has been in since then for the use for fixation of a subset of acetabular fractures. The approach helps to completely expose the pelvic ring from the Sacroiliac joint to the pubic symphysis.

These approaches have been reported to result in increased morbidity due to longer operative time, infection, greater blood loss and dissection around important and dangerous neurovascular structures [8, 9, 10]. Our modified approach reduces all these complications. In many of the fractures the complete exposure is not required for accurate reduction and fixation which has led to the development of newer less invasive approaches.

Hirvensalo et al[3] described the ilioanterior modification using two windows as well as Karunakar et al[5] described a similar modification however using two transverse incisions. The modified minimally invasive ilioinguinal approach can be used to fix most of the simple fractures treated according to the classic approach as described by Letournel [1, 2]. It reduces the risk of injury to the nerves as vessels as well as there are no

incidences of inguinal hernias as the floor of the inguinal canal is not compromised. There is excellent access to the SI joint as well as the pubic ramus; only the region of the quadrilateral plate requires indirect reduction techniques and fixation techniques. This modified approach gives almost equal access as compared to the classical approach at the same time minimizing the complications of the classical approach.

The drawbacks of this study are the small sample size. Also it can be argued that the long term results of acetabulum fractures depend on the quality of reduction and the survivorship of the natural hip and not on the type of exposure. However this study appears to show that satisfactory reduction can be achieved in a potentially less invasive manner.

## Conclusion

We conclude that for simple fracture types, Modified minimally invasive Ilioinguinal approach is a useful addition to the existing approaches. It can easily be combined with the Kocher Langenback approach for more complex fractures involving the posterior column. It does not replace the classical approach but rather provides an easy and helpful alternative in decreasing the soft tissue dissection and thus the blood loss.

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**Permission from IRB:** Yes

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