

# Management of Unstable Dennis Type II Sacral Fracture

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## Abstract

We report a case of 26 year old polytraumatized female patient, who reported to us in a state of haemorrhagic shock. The management of Dennis Type II Sacral fracture was delayed due to other life threatening conditions. The fracture was managed by Lumbopelvic stabilization and fusion.

## Introduction

Sacrum is the biomechanical nucleus of human axial skeleton as it serves as base for the spinal column as well as the keystone of pelvic ring. Sacral fractures are often missed in polytraumatized patients and the chances of identifying sacral fracture is increased by the presence of an associated neurological injury.<sup>1</sup> An existing sacral fracture was correctly identified in 76% patients presenting with neurological deficit but in only 51% of neurologically intact patients. And, according to Routt ML Jr. *et al*, approximately 30% of sacral fractures are identified late.<sup>2</sup>

As with all other fractures, delayed management of sacral fracture is complex and results are often less favourable, leading to painful deformity and progressive loss of neurological function.<sup>3</sup>

## Case Study

We present a case study of 26 years old female, who presented to us about 24 hours after the road traffic accident in a state of haemorrhagic shock with the diagnosis of :

1. Comminuted fracture of sacrum left side (Dennis type II),

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2. Bilateral superior and inferior pubic ramii fracture,
3. Fractures of 8<sup>th</sup> and 9<sup>th</sup> ribs right with fracture right clavicle,
4. Morel Lavelle lesion over right thigh,
5. Perineal contaminated lacerated wound extending from pubic symphysis to coccygeal tip and contaminated perisacral wounds,
6. Blunt intraabdominal trauma with active perihepatic bleeding.

## Management

According to Advanced Trauma Life Support System, Airway Breathing Circulation etc. were managed first. Patient was then taken up for emergency exploratory laparotomy and intra-abdominal bleeding controlled with sigmoid colostomy done to prevent faecal contamination of wounds. Simultaneously, debridement and packing of perineal and perisacral wounds with application of pelvic external fixator was done.

The perineal wound was extending from pubic symphysis to coccygeal tip, had completely torn pelvic floor, was badly contaminated and had involved the external urethral sphincter, vaginal walls and external anal sphincter (Fig. 1). Perisacral wound was muscle deep and sacrum was partly exposed. Packing, debridement and secondary closure was continued at regular intervals.

The anteriorly applied external fixator was not able to hold the posterior pelvic ring injury and even inspite of skeletal traction, the fractured part of sacrum along with pelvic ring was progressively migrating proximally and had migrated by 5 cm by the time of definitive surgery (Fig. 2).



Fig. 1 : Perineal wound with torn pelvic floor.



Fig. 2 : Pre-op X-rays showing proximally migrated left sacral ala.

The definitive fixation of sacral fracture was deferred as initially the survival of patient was unpredictable along with septicaemia and ongoing management of other injuries.

After the patient was extubated 35 days post-trauma, neurological injury in the form of left foot drop, loss of left foot plantar flexion, sensory deficit and radiculopathy in L<sub>4-5</sub>-S<sub>1</sub> dermatomes was found and injury to L<sub>4-5</sub>-S<sub>1-2</sub> was proved by electrodiagnostic studies.

#### Surgical Decision Making

Keeping in mind the fracture characteristics, namely, open fracture, neurological injury, unstable skeletal injury and systemic injury load; decision to surgically stabilize the sacral fracture was taken 38 days post trauma. As concluded by Browner BD et al<sup>4</sup>, that delayed surgery for posttraumatic sacral deformity is complex and the results are often less favourable than those of early surgery; during the surgery we also found reduction of fracture was



Fig. 3 : Post-op X-rays showing both ala at same level with intertransverse bone grafts.



Fig. 4 : 6 weeks Post-op CT scan showing good intertransverse bone formation between L<sub>4</sub> and S<sub>1</sub>.

impossible using percutaneous sacro-iliac screw after joysticking the fragments. Intraoperatively, the plan of surgery was changed to lumbo-pelvic stabilization and fusion using pedical screws, one each in L<sub>4</sub>, L<sub>5</sub> and S<sub>1</sub> pedicles and one screw in ilium parallel to the iliac crest directed towards anterior inferior iliac spine, as advised by Alexander *et al.*<sup>5</sup> To pull down the upwardly migrated sacral fragment, rod was distracted between L<sub>4-5</sub> on one side and S<sub>1</sub> with ilium on the other. After the fragment was brought down to the desired level, rod was fixed along with intertransverse fusion using autologous bone grafts. Excellent and rigid fixation was achieved with both the ala of sacrum at the same level (Fig. 3).

#### Results

Radiculopathy improved almost

immediately after surgery. Patient could be turned in bed from the next day of surgery and was allowed out of bed with partial weight bearing on the involved side as early as 2 weeks after surgery which helped in early healing of perisacral wounds, not to mention the decreased risk of DVT/PTE and atelectasis etc.

At 6 weeks post surgery, patient could comfortably walk full weight bearing using foot drop splint. There is no back or leg pain. Neurologically, there is hypoaesthesia in L<sub>4</sub>-<sub>5</sub> dermatome with persistent foot drop. Radiologically, both the ala of sacrum are at the same level, there is good intertransverse bone formation between L<sub>4</sub> and S<sub>1</sub> (Fig. 4), there is mild scoliosis (Cobb's angle 14°) between L<sub>4</sub> and S<sub>1</sub> towards left side.

Subsequent surgeries to reconstruct urinary and anal sphincters with closure of colostomy and tendon transfer for foot drop are planned later.

### Conclusion

Lumbopelvic stabilization and fusion using pedicle screws is an excellent method to reduce, maintain and stabilize difficult sacral fractures.

The timing of intervention and the optimal surgical techniques need to be determined on individual basis. Overly aggressive early surgery can lead to unacceptable intra-operative blood loss, soft tissue breakdown, infection etc.<sup>6</sup> On the other hand, delayed decompression of neural elements may adversely affect chances of neurological recovery.<sup>1</sup>

### References

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