

# Mini-invasive Vs Open posterior Osteosynthesis for posttraumatic thoracolumbar fracture: Retrospective (comparative study)

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## Abstract

**Introduction** :- Patients had mini invasive posterior osteosynthesis at thoracolumbar fracture posttraumatic, have more quick psychological good outcome and also pain score , comparing the patients had traditional open posterior osteosynthesis up to first 3 days post op , most of patient done both the Mini invasive posterior osteosynthesis(MIPOS) and traditional open posterior osteosynthesis (TOPOS) had good outcome but the time frame and pain duration more immediate recovery for MIPOS patients .

**Methods:** - Our study was retrospectively comparative study. Reviews the medical records of the 22 patient was operated in CHU ibn sina university hospital at Rabat, from time frame 2020 – up to 2024 , for 4 years ,files those was admitted at department for clinical and radiological diagnosed ,and operated for short segment posterior osteosynthesis.

**Results:** - the mean age of the 22 patients in our study of MIPOS vs. TOPOS is 38 years, at range of the age (17-63),

The female gander was 10 out of 22 patient 45 %, and 12 of them was male 55%, patient had co-morbid was 8/22 =36.36% at different types of co-morbid, Psychiatric 3 patient, Asthmatic, Tuberculosis, Smoker, Hypertension, obstetric , 14 cases had lumbalgia , 5 dorsalgia , and 3 paraplegic , it postop the main result was the MIPOS patient had less hospital stay and pain relived quick compering the TOPOS which its little longer duration of hospital and pain relief take time longer.

**Conclusion:**-the surgical outcome of the patient had mini invasive posterior osteosynthesis posttraumatic thoracolumbar, its quick and fast respond for VAS, reducing Hospital duration, instead of the open procedure little longer, and VAS its delay resolve post op.

**Keywords:** Traditional open posterior osteosynthesis; Co-morbid; Mini-invasive posterior osteosynthesis. Visual analogue scale

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## 1. Introduction

Thoracolumbar spine fractures are the most frequent fractures of the axial skeleton, and approximately two-thirds of these fractures occur between T11 and L2 [1].

Surgical treatment has been indicated for unstable fractures to stabilize the injured vertebral segment and allow early rehabilitation without orthoses or bed rest [2].

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Less invasive procedures are a growing trend in spinal surgery with an aim of minimizing tissue trauma, reducing blood loss and facilitating patient recovery.

Minimally invasive percutaneous pedicle screw fixation obtains results similar to those of traditional open surgery [3].

While there has been some contention regarding the need for posterior arthrodesis, several studies comparing fixation without fusion to traditional techniques have demonstrated similar outcomes at long-term follow-up (4)

Application of percutaneous fixation for flexion-distraction fractures has been demonstrated to be safe and resulted in less blood loss, trends toward shorter lengths of stay and operative duration, and resulted in no worse focal kyphosis at the time of surgery or follow-up compared to an open approach (5).

Our study most focusing for two main variants,

- To determine patients to evaluate the different outcome in term of the hospital time spent.
- To detect pain reduction post-op mini-invasive Vs. open traditional posterior osteosynthesis.

Our hypothesis is there direct relation quick pain relief and less hospital duration for MIPOS post-operative

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## 2. Material and methods

### 2.1. Our study was OBSERVATION retrospectively study.

Reviews the medical records of the 22 patient was operated in CHU ibn sina university hospital at Rabat, from time frame 2020 – up to 2024 , for 4 years , Files those was admitted at department for clinical and radiological diagnosed, and operated for traumatic thoracolumbar for posterior approach.

### 2.2. Including criteria:-all patient operated traumatic thoracolumbar for posterior approach

- Mini-invasive posterior short rode osteosynthesis.
- Open posterior short rode osteosynthesis.
- From 07/2020-up to 02/202
- Patients in CHU ibn sina university hospital at Rabat,

**Excluding criteria:-all patient with traumatic fracture thoracolumbar not operated or cervical traumatic fracture.**

- Anterior of lateral approach osteosynthesis
- Patient before 07/2020 or after 02/2024
- Patient for other center or hospitals.

### 2.3. Data was analysis by excel Microsoft

#### *Strength*

- This study is the primary analysis of files in the department not done before
- This study focusing two variants not done before

#### *Weakness.*

- This study conduct one center.
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## 3. Results

In our study the total patient operated was 22 patients, mean age of the patients had MIPOS vs. TOPOS is 38 years, at range of the age (17-63),

The female gander was 10 out of 22 patient 45 %, and 12 of them was male 55%, patient had co-morbid was 8/22 =36.36% at different types of co-morbid, Psychiatric 3 patient, Asthmatic, Tuberculosis, Smoker, Hypertension,

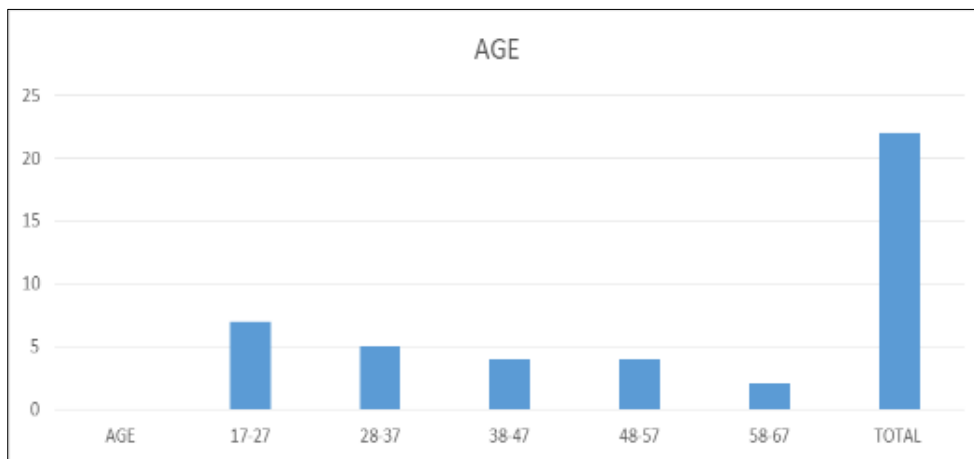
obstetric , 14 cases had lumbalgia , 5 dorsalgia , and 3 paraplegic , it postop the main result was the MIPOS patient had less hospital stay and pain relived quick compering the TOPOS which its little longer duration of hospital and pain relief take time longer ,

The all patients they had posterior osteosynthesis surgery for both MIPOS and TOPOS, was 50/50 means 11had MIPOS and 11 had TOPOS .and pre op ASIA of the all patient was , Asia A 2patients , Asia C 1 patient, Asia E 19 patients .

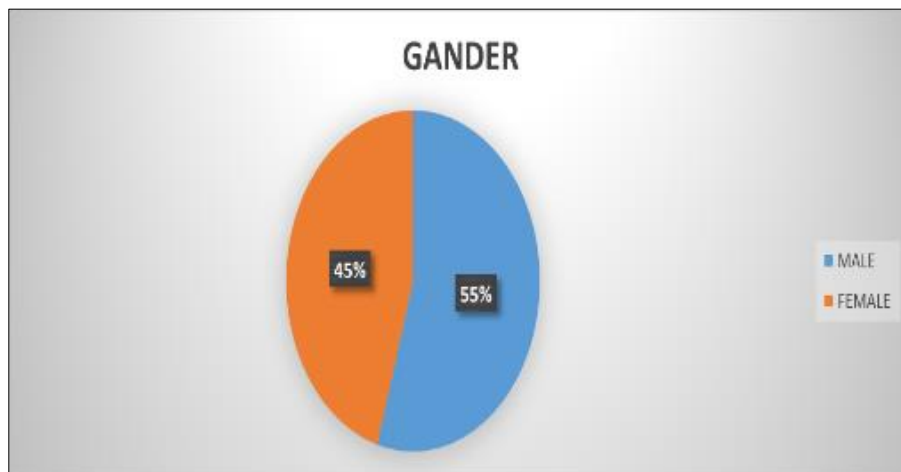
Radiological finding of the patient had trauma thoracolumbar for AO spine classification are class A1 is 1 patient ,A2 are 7 patients,A3 are 10 patients,A4 are 2 patients and B2 was 2 patients,

The hospital staying duration for post-operative patient done MIPOS maximum was 10 days, and TOPOS maximum duration for post-operative 30 days, which is indicates the mini invasive posterior osteosynthesis has less hospital duration comparing the traditional open posterior osteosynthesis.

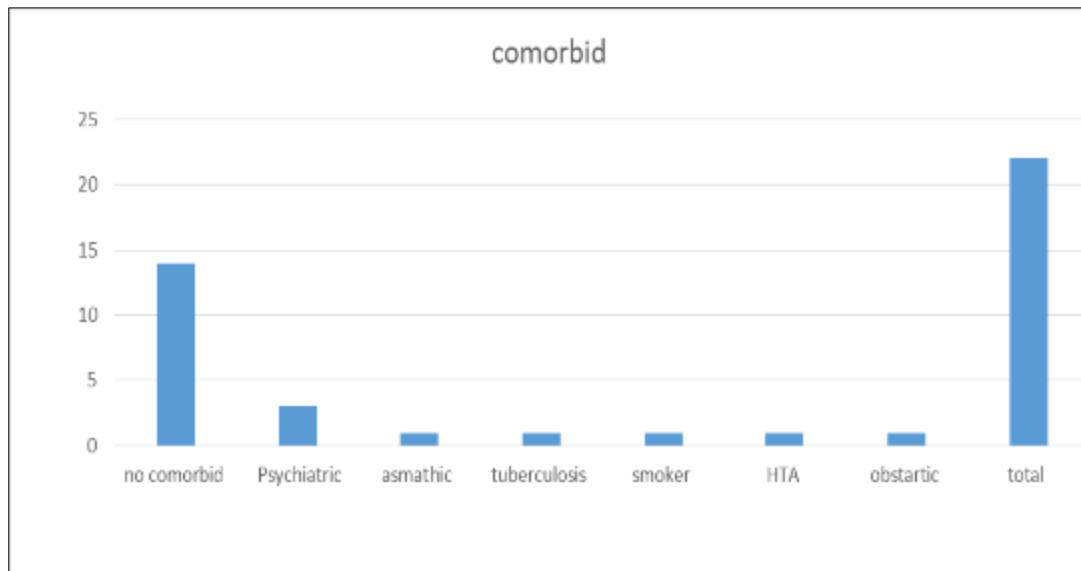
The visual analogue scale of the pain pre-operative patients > 5 scale of the pain are 15 patient at the time of the hospitalization and <5 scale was 7 patients for pain scale, and post-operative the VAS was most of the MIPOS are 2 and =3 for patient TOPOS. Its means there is more quick recovery and less pain.



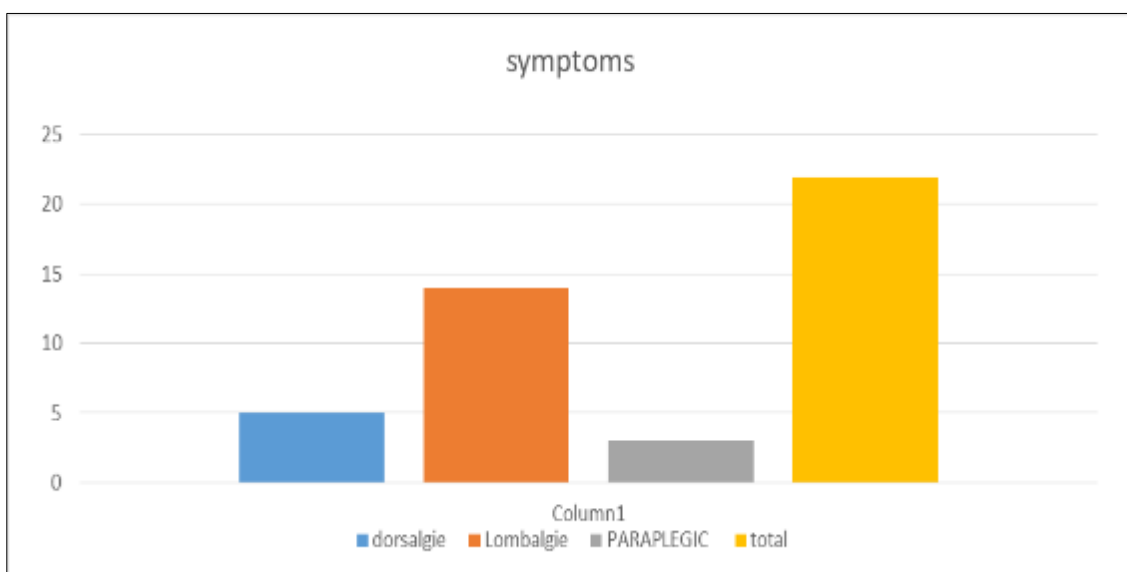
**Figure 1** Total patient was 22, 7 out of 22 they are between age (17-27), 5 out of 22 (28-37), and 4 of them are between (38-47), and 4 is between (48-57), last 2 of them (58-67)



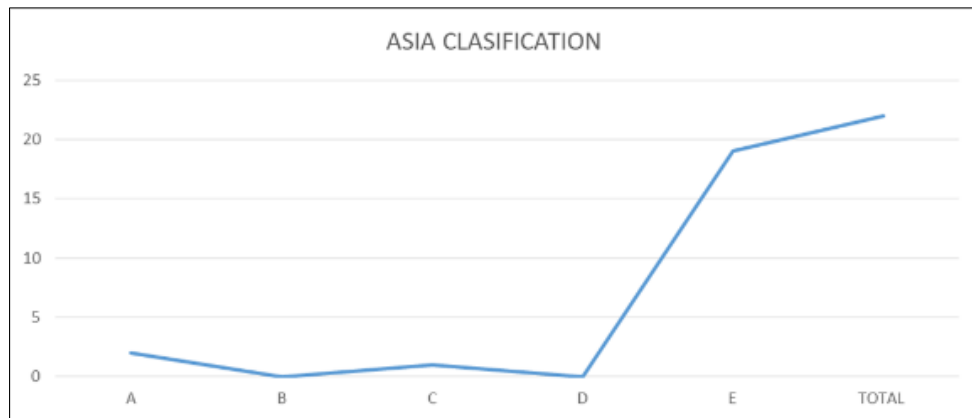
**Figure 2** The male patient more then to female patient in our study which is 55% are male which is = to 12 patient, and 45% are female which = 10 patient in our study



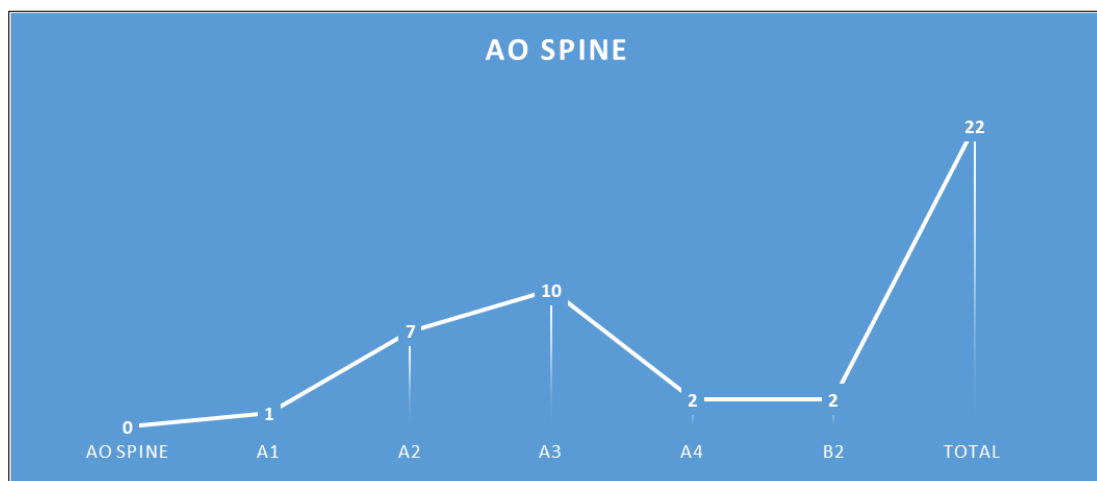
**Figure 3** Patient had co-morbid was 8/22 =36.36% at different types of co-morbid, Psychiatric 3 patient, Asthmatic, Tuberculosis, Smoker, Hypertension, obstetric.



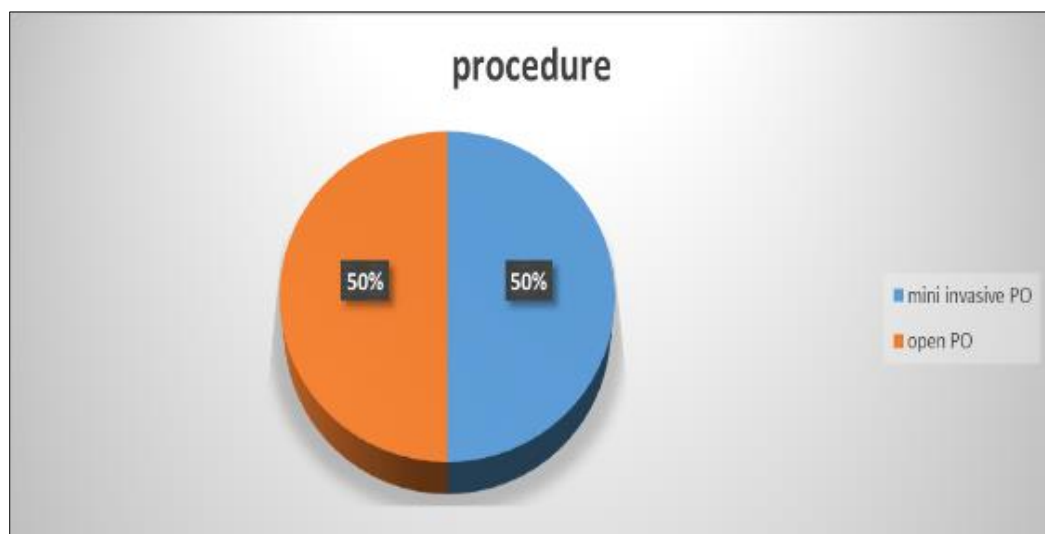
**Figure 4** The above diagram shows the patient more presenting for lomalgia are 14out of the 22 and the 5 of them presenting dorsalgia and 3 of them had paraplegic



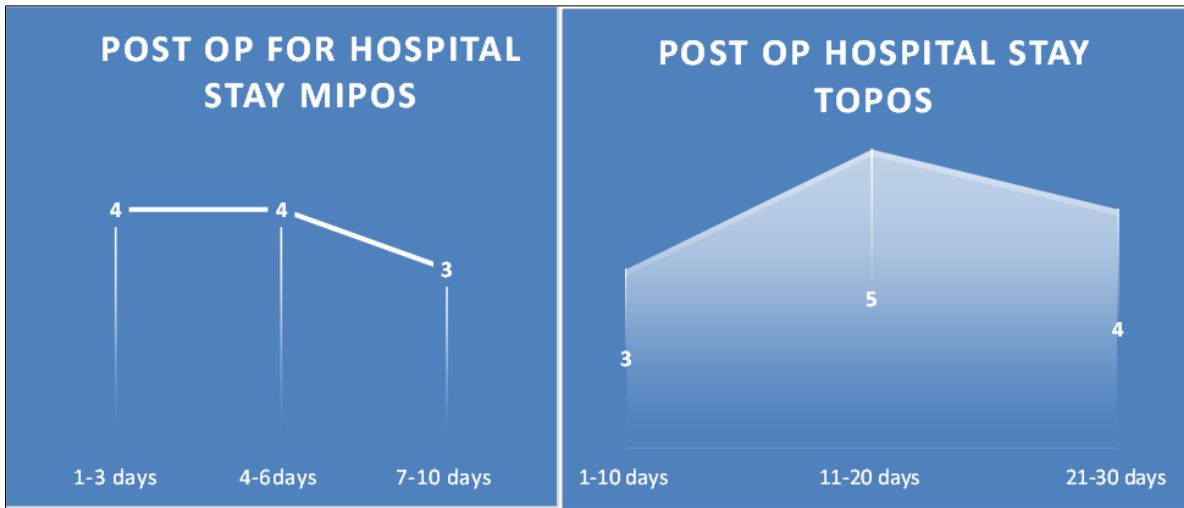
**Figure 5** Total Patients Are 22 , For Asia Assessments , Asia A There Is 2 Patient, Asia C Are 1 Patients ,Asia D 12 Patients , Asia E Are 19 Patients ,



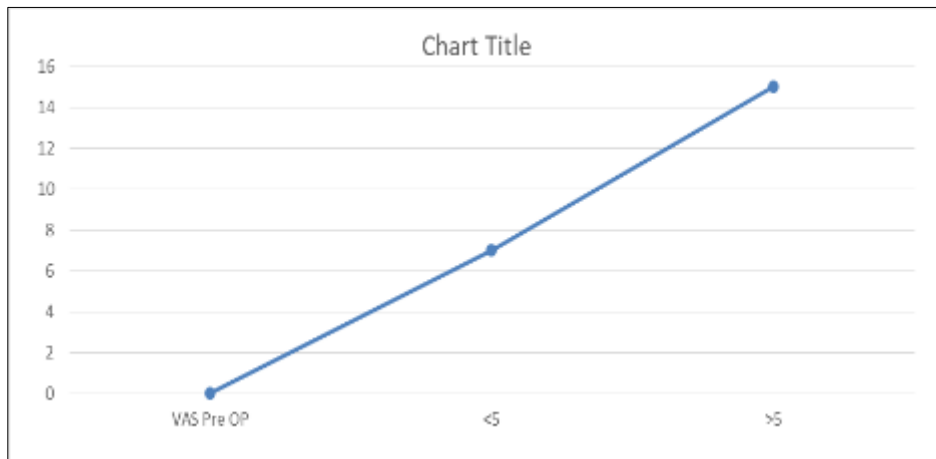
**Figure 6** AO spine classification are class A1 is 1 patient ,A2 are 7 patients,A3 are 10 patients,A4 are 2 patients and B2 was 2 patients,



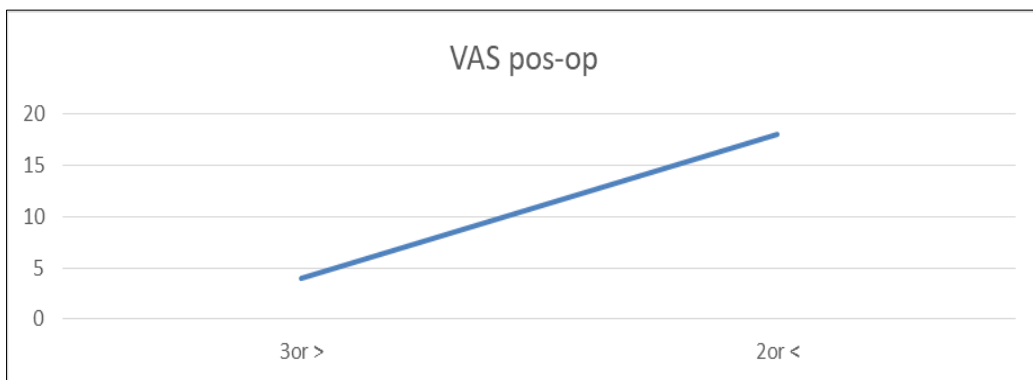
**Figure 7** The patient was the 50/50 , means 11 out 22 are done MIPOS ,and 11 out of 22 are dine TOPOS.



**Figure 8** The hospital staying duration for post-operative patient done MIPOS maximum was 10 days, and TOPOS maximum duration for post-operative 30 days,



**Figure 9** The visual analogue scale of the pain pre-operative patients > 5 scale of the pain are 15 patient at the time of the hospitalization and <5 scale was 7 patients for pain scale,



**Figure 10** Post-operative the VAS was most of the MIPOS are 2 and =3 for patient TOPOS. Its means there is more quick recovery and less pain.

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#### 4. Discussion

Previous studies have indicated that surgery in patients with traumatic thoracolumbar fracture for mini invasive is less hospital stay and bleeding also pain relief quick comparing to the traditional open posterior osteosynthesis. (Gong Y, Fu G, Li B, Li Y, Yang X). The percutaneous approach presented better results for some clinical and radiological outcomes than the open approach and even reduced the complication rate [Z].

Lee et al, Vanek et al, and Dong et al all noted a significant difference in the immediate postoperative period in the VAS scores between the percutaneous and open groups, with significantly lower VAS scores noted in the percutaneous group (6) our study shows same result the VAS for pain the patients had Mini invasive posterior osteosynthesis had 2 or equal 2 means the pain resolving is more quick for relation the tissue damage and incision diameter. . ,

Patients has mini invasive posterior osteosynthesis had more advantage over the traditional open posterior osteosynthesis for hospital duration post op and pain relief , which effecting psychological effect of the patient ,and also less infection the side of the surgery in our study for assessment the VAS and hospital stay had great improvement for the MIPOS procedure comparing to TOPOS

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#### 5. Conclusion

The surgical outcome of the patient had mini invasive posterior osteosynthesis posttraumatic thoracolumbar, its quick and fast respond for VAS, reducing Hospital duration, instead of the open procedure little longer, and VAS its delay resolve post op.

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#### Compliance with ethical standards

##### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

##### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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#### References

- [1] Magerl F, Aebi M, Gertzbein SD, Harms J, Nazarian S. A comprehensive classification of thoracic and lumbar injuries. *Eur Spine J*. 1994;3(4):184–201. doi: 10.1007/BF02221591. [PubMed] [CrossRef] [Google Scholar]
- [2] Carl AL, Tromanhauser SG, Roger DJ. Pedicle screw instrumentation for thoracolumbar burst fractures and fracture-dislocations. *Spine*. 1992;17(8):S317–S324. doi: 10.1097/00007632-199208001-00018. [PubMed] [CrossRef] [Google Scholar]
- [3] Lee JK, Jang JW, Kim TW, Kim TS, Kim SH, Moon SJ. Percutaneous short-segment pedicle screw placement without fusion in the treatment of thoracolumbar burst fractures: is it effective? *Acta Neurochir*. 2013;155(12):2305–12. doi: 10.1007/s00701-013-1859-x. [PubMed] [CrossRef] [Google Scholar]
- [4] Alvine GF, Swain JM, Asher MA, Burton DC. Treatment of thoracolumbar burst fractures with variable screw placement or Isola instrumentation and arthrodesis: case series and literature review. *J Spinal Disord Tech*. 2004;17(4):251–264. doi: 10.1097/01.bsd.0000095827.98982.88. [PubMed] [CrossRef] [Google Scholar]
- [5] Esses SI, Botsford DJ, Kostuik JP. Evaluation of surgical treatment for burst fractures. *Spine*. 1990;15(7):667–673. doi: 10.1097/00007632-199007000-00010. [PubMed] [CrossRef] [Google Scholar]
- [6] Barbagallo GMV, Raudino G, Visocchi M, Alobaid AA, Al-Mutair AA, Naveen T, Certo F. Restoration of thoracolumbar spine stability and alignment in elderly patients using minimally invasive spine surgery (MISS). A safe and feasible option in degenerative and traumatic spine diseases. *Acta Neurochir Suppl*. 2017;124:69–74. doi: 10.1007/978-3-319-39546-3\_11. [PubMed] [CrossRef] [Google Scholar].
- [7] Kreinest M, Rillig J, Grützner PA, Küffer M, Tinelli M, Matschke S. Analysis of complications and perioperative data after open or percutaneous dorsal instrumentation following traumatic spinal fracture of the thoracic and lumbar spine: a retrospective cohort study including 491 patients. *Eur Spine J*.