OBJECTIVES

- Transforminal Lumbar Interbody Fusion (TLIF) is used to treat mechanical back-pain and radicular pain associated with spondylolisthesis or “slipped bone” due to arthritis, herniated disc or spinal stenosis
- TLIF “fuses” the bone to stop the segment below to decrease the pain from the joint (1)
- This procedure can be performed in two ways:
  - traditional open technique where a patient’s back muscles are incised and split to expose the lumbar vertebrae (open TLIF)
  - Minimally invasive surgical (MIS TLIF) technique uses a “muscle-dilating” approach requiring several small incisions to insert instrumentation (MIS TLIF)
- There is less blood loss and pain for the patient when dilating the muscle as oppose to splitting
- There is also less recovery time and thus early mobilization, which has the potential to decrease hospital length of stay.(2)
- MIS TLIF could reduce complications associated with open fusion, a procedure that Medicare has spent approximately $1 billion.
- However, the new technology may encourage more surgeons to conduct the procedure and potentially more patients will unnecessarily undergo it increasing costs. (3, 4)

METHODS

- A comprehensive search of all prospective and retrospective cohort studies comparing MIS fusion to open fusion were searched using PubMed, EMBASE and the Cochrane library
- The search is current as of June 7, 2012
- Figure 1 contains the PRISMA diagram of how studies were selected
- Of the 15 selected for full-text review, 4 were excluded for wrong surgical technique, no use of MIS, and did not measure the proper outcomes.
- All studies were coded for quality using the method by Downs and Black (1998)(6) where the higher the number the higher the quality of study
- Where studies were missing standard deviation (SD) measurements, an average of studies that had SD was taken and the mean was imputed for those missing
- Effects sizes (relative risks and standardized mean differences) were calculated using both fixed- and random-effects models with 95% confidence intervals
- When measuring the ODI and VAS the postoperative score was taken at the last time point available for the study. For two studies it was estimated to be at 12 months and for 3 studies it was estimated at 24 months
- Studies were analyzed using mean and standard deviations and standardised mean differences (SMD) were calculated using both fixed- and random-effects models with 95% confidence intervals
- Random-effects models was chosen due to the high heterogeneity across studies for each outcome (53.1% - 93.5%)
- Standardized mean difference (SMD) was converted by calculating the standard deviations of the mean scores for the open group and multiplied times the pooled SMD to give a meaningful value for reporting
- Operating room time was the only measure to favor open TLIF when compared to MIS TLIF.
- Length of hospitalization and blood loss during the procedure were both significantly decreased in the MIS TLIF intervention, while operating room time significantly increase when compared to open TLIF.
- The preoperative scores for both the ODI and the VAS were also not statistically different between the two interventions.
- It is the conclusion of the author based on this finding that preoperative scores of ODI and VAS do not determine which procedure patients undergo.
- A side observation is that the United States seems to have lower pain thresholds for surgical intervention when compared to countries in the series.
- Hospital length of stay is much higher in other countries when compared to the United States.
- A limitation of this study was the high heterogeneity in these studies (53.1% - 93.5%).