

Enhancing Surgical Decision-Making in Lumbar Degenerative Spondylolisthesis: A Comparative Evaluation of UCSF DS and DSIC Classification Systems

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Disclosures

• Nil

Introduction

- Prevalence is around 13.6% of the adult population, with the highest occurrence at the L4/5 vertebral level
- The cost of surgery can vary depending on the specific procedure and location
- A standardized protocol for surgical decision-making has yet to be established.
- Modern classification systems aim to standardize surgical decision-making by predicting interventions.

Objective

Study Objective: Evaluate DISC and UCSF DS classification systems to predict appropriate surgical interventions and improve patient care.

Key Frameworks:

DSIC System: Degenerative spondylolisthesis instability classification. Simmonds et al. 2015

- Focuses on instability (stable, potentially unstable, unstable).
- Links radiographic findings to surgical recommendations.

UCSF DS System: University of California San Francisco Degenerative Spondylolisthesis. Rangwala et al. 2023

- Considers dynamic instability, sagittal alignment, and clinical presentation.
- Focus: Less invasive, patient-centered care.

S-DSIC

Simmonds et al. 2015

Parameter	Type 1 – Stable	Type 2 – Potentially Unstable	Type 3 – Unstable
Low- Back Pain	None or very mild	Primary or Secondary Complaint	Primary or Secondary Complaint
Restabilisation	Restabilisation signs - narrowed disc height	Grossly - Some restabilisation signs – reduced disc height	No restabilisation signs, normal to slightly reduced disc height
Disc Angle	Lordotic disc angle on flexion radiograph or <3mm of translation on dynamic films	Neutral disc angle on flexion radiographs or 3-5 mm of translation on dynamic films	Kyphotic disc angle on flexion radiographs or >5mm of translation on dynamic films
Joint Effusion	No facet joint effusions on MRI	Facet joint effusion on MRI without joint distraction	Large facet joint effusion on MRI
Surgical Approach	Decompression Alone	Decompression and Posterior fusion	Decompression and posterior fusion with interbody fusion

UCSF-DS

Segmental instability	dynamic Location of stenosis	of spinal Sagittal alignment	Primary presentation	clinical	Surgical Intervention
<3mm translation	Central or lateral recess stenosis alone	Maintained segmental lordosis	Primary leg pain		Decompression alone
3-5 mm translation	Foraminal without stenosis	stenosis up/down kyphotic alignment	Both leg and back pain		Decompression with posterior fusion
>5mm translation	Foraminal with stenosis	stenosis up/down Global malalignment (SVA >5cm or PT > 30°)	Primarily Back pain		Decompression with posterior fusion and interbody fusion

Methods

Study Design:

- Retrospective analysis of 89 DSLS cases.

Classification systems applied:

- DSIC: Focuses on instability levels and surgical interventions.
- UCSF DS: Incorporates four domains, including sagittal alignment and clinical presentation.

Metrics:

- Predictive accuracy measured by F1 scores.
- Alignment of predicted vs. actual surgical interventions analyzed.

Results

Performance Highlights:

UCSF DS System:

F1 Score: 0.438.
Correctly predicted surgical interventions: 43.8%.
Recommended less invasive procedures: 41.6%.

DSIC System:

F1 Score: 0.371.
Correctly predicted surgical interventions: 37.1%.
Suggested more invasive procedures: 39.3%.

Conclusion

Key Takeaways:

- UCSF DS outperformed DSIC in predictive accuracy and alignment with clinical practices.
- UCSF DS's preference for less invasive surgeries supports cost effective, patient centered care.

Limitations:

- Retrospective study design.
- Lack of quality-of-life (QoL) data for evaluating long-term outcomes.

Future Directions:

- Incorporate additional parameters like comorbidities and functional outcomes.
- Prospective validation to confirm effectiveness in clinical settings.

Thank you