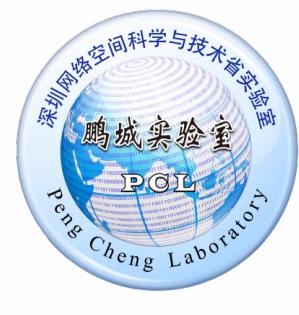


Surgical Skill Assessment on In-Vivo Clinical Data via the Clearness of Operating Field

Daochang Liu, Tingting Jiang, Yizhou Wang, Rulin Miao, Fei Shan, and Ziyu Li



北京大学
PEKING UNIVERSITY



北京大学 肿瘤医院
BEIJING CANCER HOSPITAL

深睿医疗
Deepwise

NELV

Introduction

Surgical skill assessment:

Surgical Data >> Automated Model >> Surgeon's Skill Scores



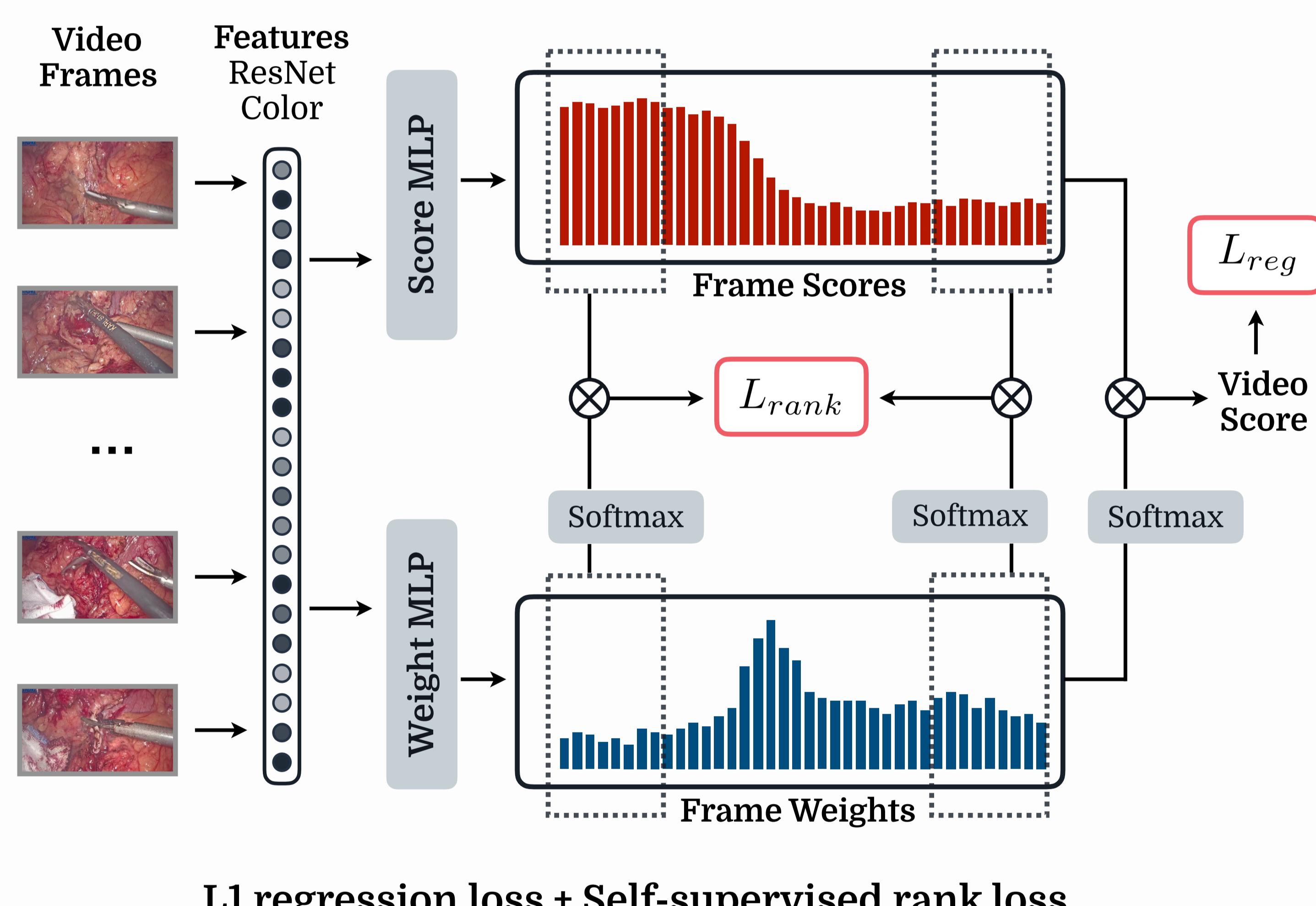
Clinical Dataset

- 57 gastrectomy videos
- 1 operating surgeon
- 6 annotating surgeon
- 3 juniors and 3 seniors
- 14 skill metrics
- Likert Scale 1-5
- Mean of seniors as ground truth

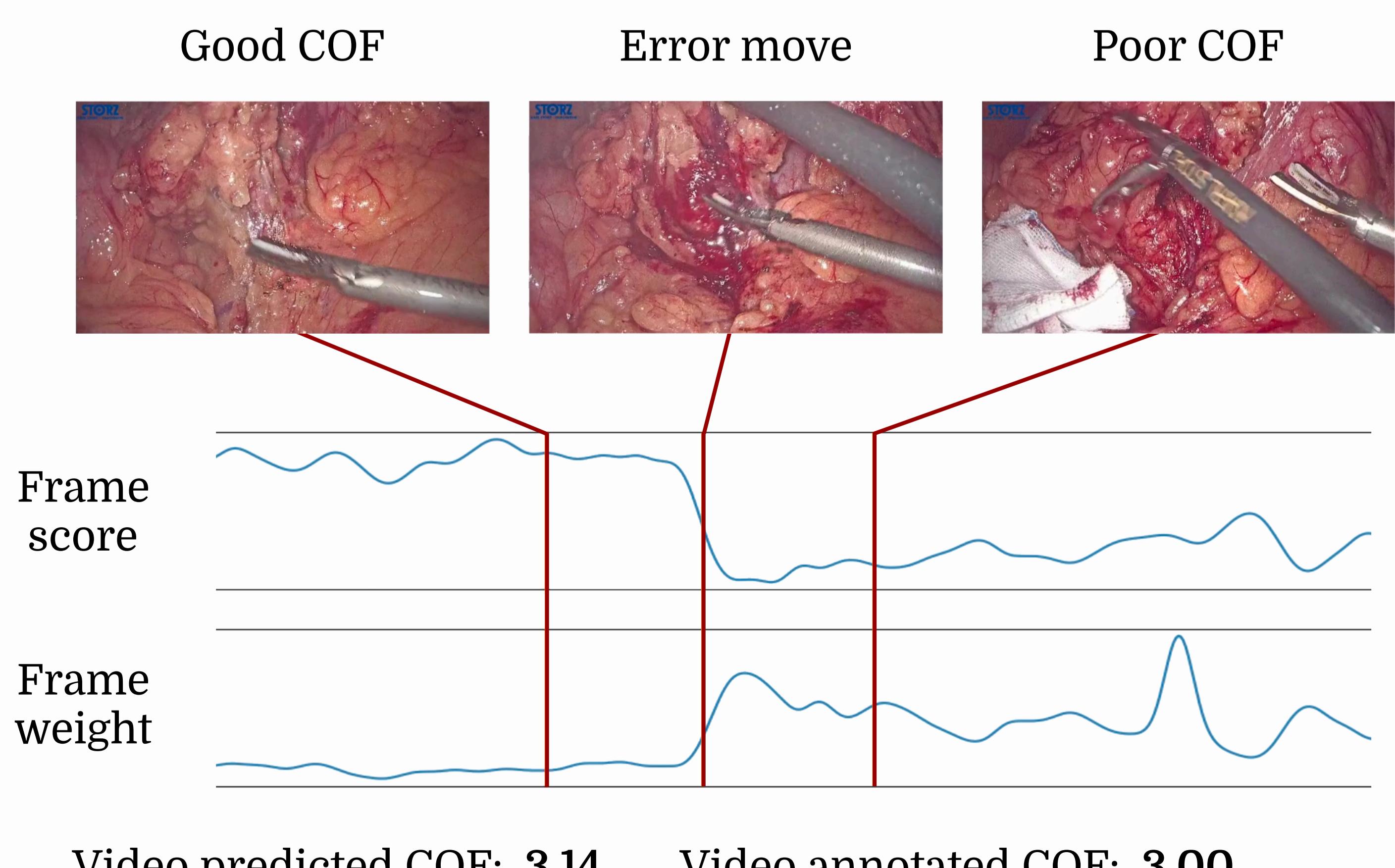
6 Technical (OSATS)	Gentleness	T1
	Time and Motion	T2
	Instrument Handling	T3
	Flow of Operation	T4
	Tissue Exposure	T5
	Overall Technical Skill	
	OTS	
	Dissection in Correct Planes	P1
	Vessel Exposure and Transection	P2
	Venous Breakpoint Selection	P3

7 Procedural	Arterial Breakpoint Selection	P4
	Infrapyloric Artery Exposure	P5
	Care for Adjacent Organs	P6
	Overall Procedural Skill	
	OPS	
	Clearness of Operating Field	COF
	High correlation with overall skills	
	OTS	
	T5	T5
	T4	T4

Model

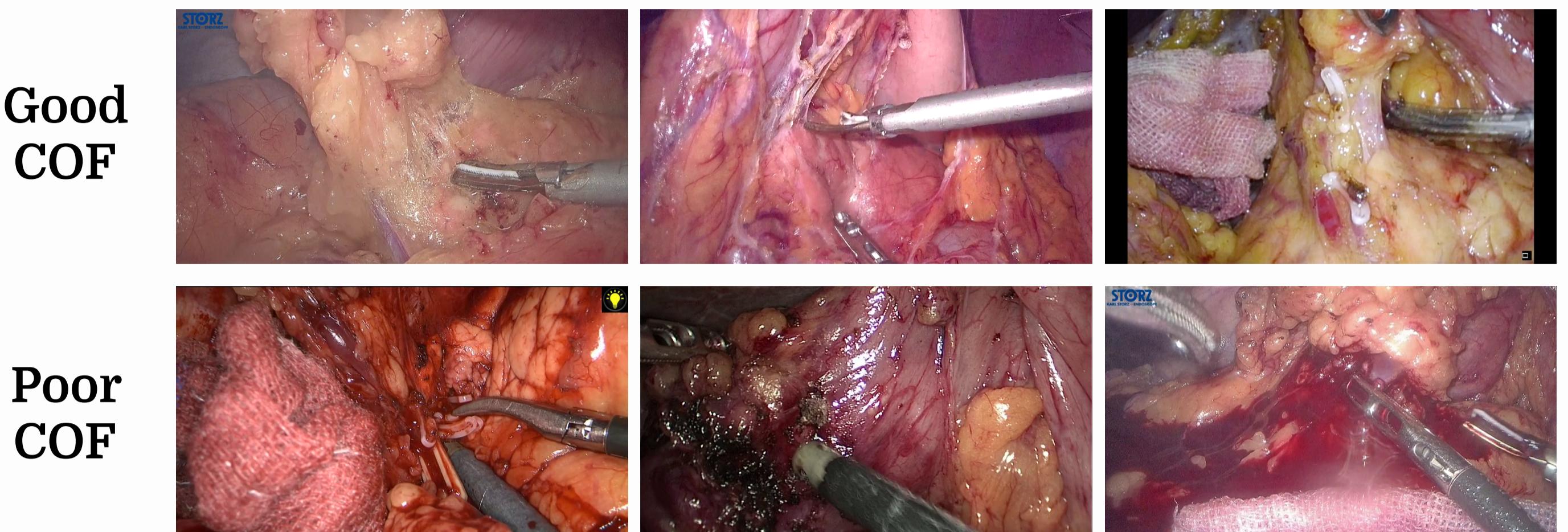


Visualization

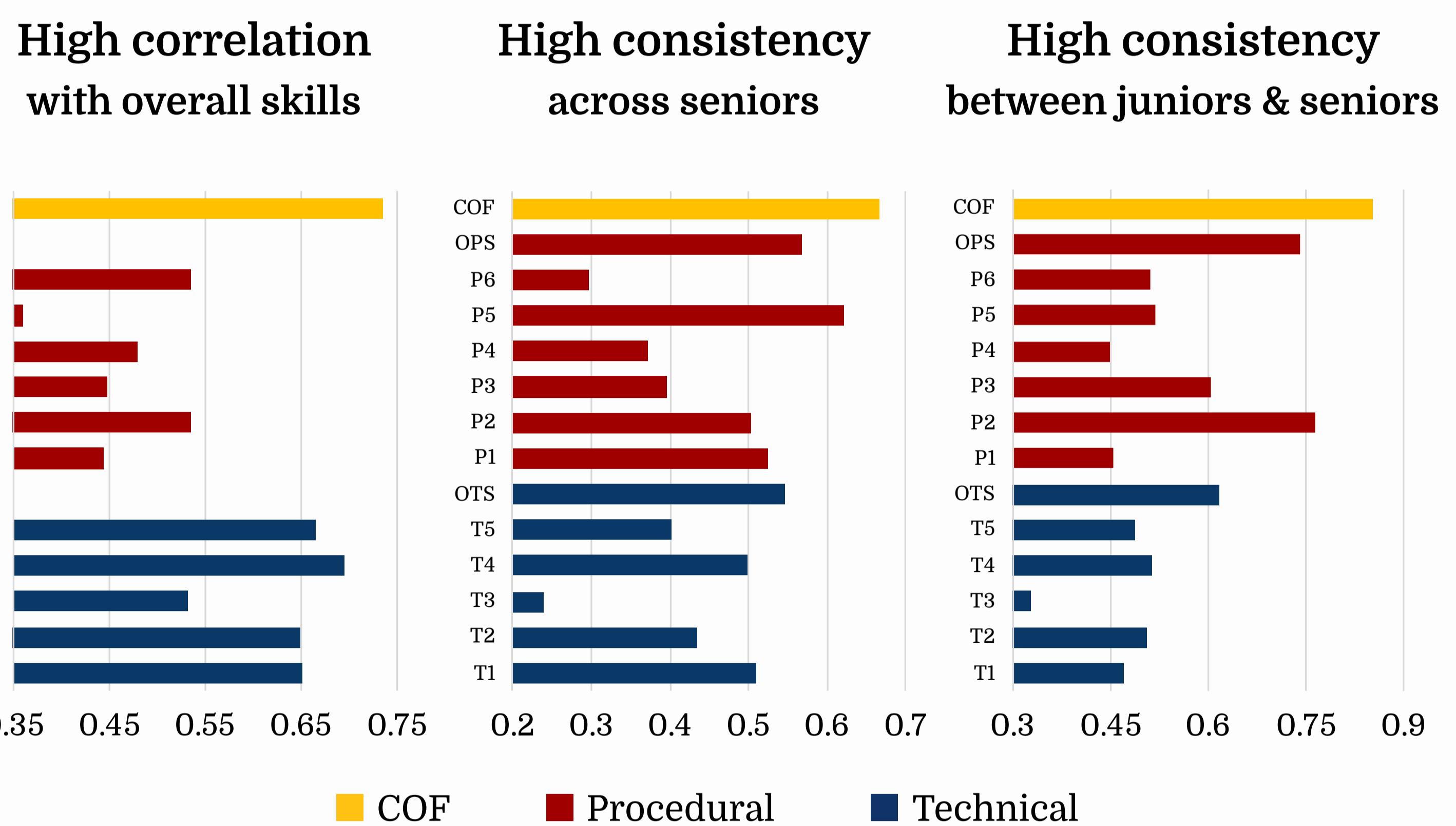


Clearness of Operating Field (COF)

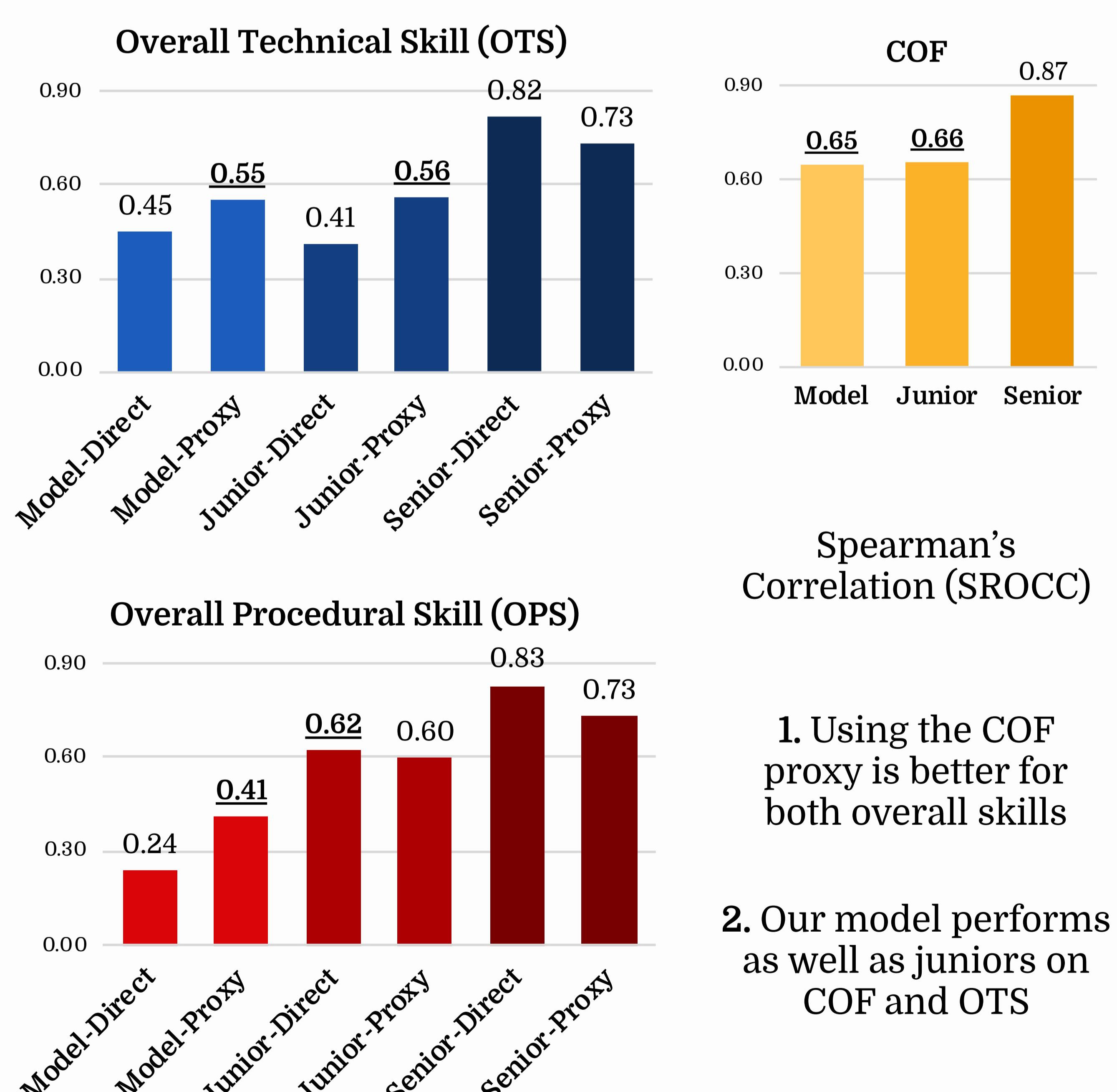
How does the bleeding affect the visibility of anatomy landmarks



Why is COF a good skill proxy



Experiments



1. Using the COF proxy is better for both overall skills
2. Our model performs as well as juniors on COF and OTS

Conclusion

Contribution:

- Skill assessment on clinical data
- COF as a good skill proxy
- An effective automated model

Limitations:

- Only a single operating surgeon
- Only gastrectomy procedures

Scan for paper!

