The Influence of Musical Experience on Laparoscopic Surgical Skill Performance

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Introduction

- Skills that surgeons must perfect require a high level of fine motor and spatial dexterity, along with long hours of practice
- Recent studies have focused on identifying factors that may be related to faster and higher-quality surgical skills acquisition[1-4]
- **Aim:** To determine the potential relationship between instrumental musical experience and laparoscopic surgical skill performance

Methods

PARTICIPANTS

- Attendees of the 2023 SAGES Conference in Montreal, QC were invited to participate in the "Top Gun Shootout", a competition-based surgical skill competition
- Participants completed a demographic survey and answered several questions regarding personal musical experience
- Participants rotated through three skills tasks:
    1. Fundamentals of Laparoscopic Surgery (FLS) Peg Transfer
    2. Bean Drop (BD)
    3. Timed Intracorporeal Suturing (TIS)
- All three task scores were totaled to calculate the individuals' Total Top Gun Score (TTGS)
- Of note, a higher score (seconds) indicates poorer task performance

DATA ANALYSIS

- Descriptive statistics for participant demographics and instrument use were completed. Mann-Whitney and Kruskal-Wallis tests to evaluate relationships between instrument experience and task scores. Statistical analyses were completed in SPSS Version 27

Participant Demographics

- Fifty-seven individuals participated in the study
    - Fifty-three (93.0%) General Surgeons
    - One (1.8%) OB-GYN
    - Three (5.2%) non-surgeons
- Average age: 32 y (SD=5.9 y)
- Average number of years in training: 4 y (Range = 0-14 y)
- Thirty-one (54.4%) played at least one musical instrument, and five of these individuals played more than one instrument

Results

TASK PERFORMANCE

- There was no statistically significant difference in event scores between individuals who played an instrument and those who did not (p>.05) (Figure 1)
- Within the musician group, there were no statistically significant correlations between task scores and instrument classification (p>.05)
- There was a statistically significant, positive correlation between the number of instruments played and score on the BD task (r=.273; p=.08), indicating a worse performance for those playing a greater number of instruments
- No significant relationships between the number of instruments and FLS or TIS scores were identified

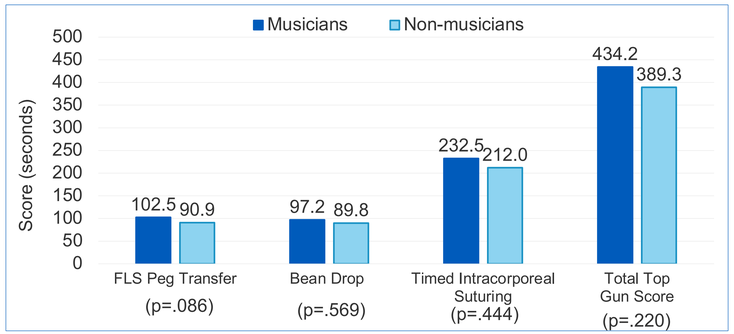


Figure 1. Average event scores by musician classification. Mann-Whitney Non-Parametric Test was used to determine mean differences and p-values. Lower score indicates better performance.

Characteristics		Musicians (n=31)
Number of Instruments		**n (%)**
1		26 (83.9)
2		4 (12.9)
3		1 (3.2)
Instrument Class	**Instrument Type**	n (%)
String (n=15)	**Guitar**	10 (32.3)
	Violin	3 (9.7)
	Ukulele	1 (3.2)
	Cello	1 (3.2)
Zither (n=1)	**Santoor**	1 (3.2)
Woodwind (n=7)	**Oboe**	1 (3.2)
	Saxophone	2 (6.5)
	Clarinet	2 (6.5)
	Flute	2 (6.5)
Brass (n=1)	**Trumpet**	1 (3.2)
Keyboard (n=15)	**Keyboard**	1 (3.2)
	Harmonium	1 (3.2)
	Piano	13 (41.9)

Table 1. Descriptive statistics of musician group

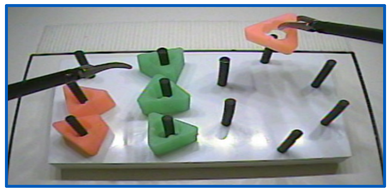


Figure 2. FLS Peg Transfer Task



Figure 3. Bean Drop (BD) Task



Figure 4. Intracorporeal Suturing (TIS) Task

- Previous studies have shown that individuals with musical instrument education and experience had better performance on surgical and visuo-spatial skills tasks[1-8]
- Other investigations demonstrated little to no correlation between musical experience and superior surgical skill performance[9-14]
- Participants with a higher number of played instruments had inferior performance on the BD task, which is designed to emphasize dexterity and fine motor control[15]
    - This contradicts our expectations, as these skills have been shown to develop in individuals who practice musical instruments[16-18]
- The present study suggests that having musical instrument experience or a broader musical instrument repertoire does not uniformly enhance laparoscopic skills

LIMITATIONS

- This study was competitive in nature with a brief duration of participant interaction
- Self-reported data introduces potential sources of inaccuracy
- Limited sample size composed mainly of general surgeons

Conclusions

- Our results indicate no difference in laparoscopic skills across varying levels of musical experience
- There may still be value in incorporating diverse skill development methodologies into surgical education
- Future research should investigate the associations between musical experience and surgical skills on a larger scale

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