UNIVERSITY OF SOUTH DAKOTA
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Grid Localization Testing With Different Grid Sizes

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Background

- Low Back Pain (LBP) has a high prevalence rate and has been increasing (3.9%- 10.2% from 1992-2006).
- LBP has also shown to produce changes in the primary and secondary somatosensory cortices. These changes have shown to reduce tactile acuity and impact the sensory ability to distinguish the quality and location of touch.
- There is evidence that these changes may be a factor that relates to the persistent symptoms of LBP.

Purpose

- Purpose of this study was to observe grid localization testing (GLT) with different grid sizes in patients without back pain.

Study Design

- Cohort Observational Study

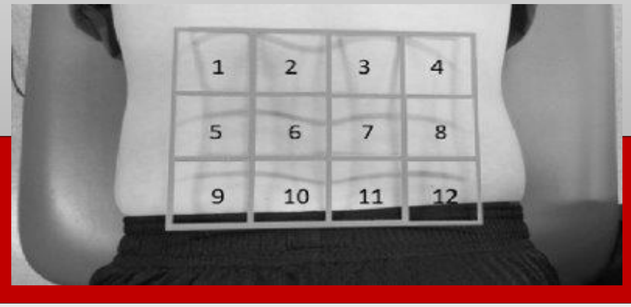
Methods

Procedure

- Informed consent and demographic data intake.
- Randomly assigned grid order and touch point sequence.
- Participant put in prone testing position with posterior superior iliac spine (PSIS) exposed.
- Grid aligned with PSIS and spine with orientation to the grid by gently blanching the skin and participant observing the paper copy of the grid.
- The participant was oriented to each grid prior to testing.
- A series of 20 touches was performed followed by a 5-minute washout period.
- Repeat with remaining 2 grids.

Data Analysis

Data was analyzed with the IBM SPSS Statistics for Windows, Version 25 (IBM Corp., Armonk, N.Y., USA). Means and frequency counts were recorded for the demographics data. One-way ANOVA was used to determine if there was a difference between subjects comparing the small, medium (standard), and large grid sizes. Bonferroni correction utilized to determine significance. Pearson correlation calculated for comparison of grid size and accuracy scores with two-point discrimination test result. Strength of correlation coefficient was valued at good to excellent (above 0.75), moderate to good (0.50 to 0.75), fair (0.25 to 0.50) and little or no relationship (less than 0.25). A p-value of <0.05 was set for significance level.



Results

Grid localization mean error rate values for participants with the different sized grids are presented in table 2 below.

Table 1: *Demographics (n = 30)*

Characteristics	Mean (SD)	Minimum	Maximum
Gender (Female)	17		
Age (Years)	24.77 (4.23)	21	44
Race (White)	28		

Table 2: *Mean Error Rate*

Grid Size	Mean Error Rate (SD)
Small	8.63 (2.79)
Medium	4.03 (2.67)
Large	3.53 (2.73)

One-way ANOVA revealed a significance difference in mean error rate of the small grid to both the medium and large grids. No difference was found between the medium and large grid sizes (table 3). Bonferroni correction was applied to adjust for multiple comparisons.

Table 3: *Pairwise Comparison of Mean Error Rate*

Grid Comparison	Mean difference	p-value	95% Confidence Interval for Difference	
			Lower Bound	Upper Bound
Small vs Medium	4.60	<.001	3.08	6.13
Small vs Large	5.10	<.001	3.52	6.68
Medium vs Large	0.50	0.996	-0.79	1.79

We did not observe order of grid size tested nor touch point sequence having a significant effect on mean error rates.

Conclusion

- Grid size at 25 mm (2 SD) smaller than previous research at 50 mm size produced significantly more errors in GLT
- Grid size at 75mm- (2 SD) larger did not change the error rate from the 50 mm grid
- Similar error rate was found with 50 mm grid compared to previous research
- Order of testing or touch point sequence did not affect error rate during GLT

Limitations

- Small sample size of 30 participants.
- Limited diversity
- Inaccurate sample image as the image depicted only the medium sized grid.
- Grid outside of lumbar spine on petite participants and did not account for anatomical differences in size between participants.

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