INTRODUCTION

Qualitative studies investigating the sexual activity of people with low back pain (LBP) found a substantial reduction in the frequency of coitus [1]. Pain during coitus has been linked to mechanical factors, such as movements and postures, which are reported as the primary reason for this decreased frequency [2]. Despite these implications, a biomechanical analysis of coitus, to date, has not been conducted [3]. The main objective of this study was to describe female lumbar spine motion during coitus and compare this motion across five common coital positions.

METHODS

Ten healthy females (29.8 ± 8.0 years, 164.9 ± 3.0 centimeters, 64.2 ± 7.2 kilograms) and ten healthy males participated in this study. These couples had approximately 4.7 ± 3.9 years of sexual experience with each other. Each couple engaged in coitus in five pre-selected positions (presented in random order) for 20 seconds per position. Three-dimensional (3D) lumbar spine kinematic data was continuously collected for the duration of each trial by an electromagnetic motion capture system. The five coital positions chosen were as follows: fQUAD1 – female quadruped with elbow support, male kneeling behind; fQUAD2 – female quadruped with hand support, male kneeling behind; fMISS1 – female supine with minimal hip or knee flexion, male prone on top; fMISS2 – female supine with hip and knee flexion, male prone on top; and fSIDE – female side-lying, male side-lying behind.

The spine kinematic profile across all coital positions was found to be primarily sagittal plane movement (i.e., flexion/extension), cyclic in nature, but variable over time, so the amplitude probability distribution function (APDF) of female lumbar spine kinematics in the sagittal plane, expressed as percentages of lumbar spine active range of flexion and extension motion (% aROM), was deemed the most appropriate analysis tool to compare coital motion across all positions. To determine if each coital position had distinct spine kinematic profiles, separate univariate general linear models (GLM) (factor: coital position = five levels, \( \alpha =0.05 \)) followed by Tukey’s Honestly Significant Difference (HSD) post hoc analysis were used on amplitude probabilities of 0.0, 0.5, and 1.0.

RESULTS AND DISCUSSION

In comparison to all other coital positions, fMISS2 values at amplitude probabilities of 0.0, 0.5, and 1.0 were lowest, followed by fMISS1, fQUAD1, fSIDE, and fQUAD2 (Table 1 and Fig. 1).

Table 1: Female lumbar spine angular displacements (% aROM) at amplitude probabilities of 0.0, 0.5, and 1.0 for all coital positions.

<table>
<thead>
<tr>
<th>Amplitude Probability</th>
<th>fQUAD1</th>
<th>fQUAD2</th>
<th>fMISS1</th>
<th>fMISS2</th>
<th>fSIDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>-21.97 ±34.51</td>
<td>9.00 ±41.62</td>
<td>-49.81 ±19.90</td>
<td>-65.55 ±17.75</td>
<td>-4.43 ±34.83</td>
</tr>
<tr>
<td>0.5</td>
<td>14.35 ±40.76</td>
<td>52.40 ±44.45</td>
<td>-28.16 ±13.04</td>
<td>-50.70 ±16.13</td>
<td>26.65 ±35.97</td>
</tr>
<tr>
<td>1.0</td>
<td>49.00 ±41.95</td>
<td>77.00 ±45.17</td>
<td>-2.50 ±25.45</td>
<td>-28.89 ±14.53</td>
<td>48.00 ±34.50</td>
</tr>
</tbody>
</table>

Note: A negative value represents spine flexion and a position value represents spine extension.

Significant differences were found at amplitude probabilities of 0.0 (\( F(4,31)=12.602, p<.001 \)), 0.5 (\( F(4,31)=19.805, p<.001 \)), and 1.0 (\( F(4,31)=22.261, p<.001 \)). At all three amplitude probabilities, fMISS2 was significantly different from fQUAD1 (\( p=.006, p<.001 \), and \( p<.001 \), respectively),
fQUAD2 ($p<.001$, $p<.001$, and $p<.001$, respectively), and fSIDE ($p<.001$, $p<.001$, and $p<.001$, respectively) and fMISS1 was significantly different from fQUAD2 ($p=.001$, $p<.001$, and $p<.001$, respectively) and fSIDE ($p=.012$, $p=.004$, and $p=.008$, respectively). fMISS1 was also significantly different from fQUAD1 at amplitude probabilities of 0.5 ($p=.039$) and 1.0 ($p=.006$). fQUAD1 was significantly different from fQUAD2 at an amplitude probability of 0.5 ($p=.031$).

**Figure 1:** APDF results for female spine kinematics across all coital positions.

Note: The purple dashed horizontal lines indicate the amplitude probabilities at which statistical tests were performed (i.e., 0.0, 0.5, and 1.0). The purple dashed vertical line indicates zero lumbar spine angular displacement (i.e., a neutral spine position) – to the left of this line is lumbar spine flexion and to the right of this line is lumbar spine extension.

The results found in this biomechanical analysis of common coital positions may be useful in a clinical context. In particular, for the flexion-, extension-, and motion-intolerant patient [4], certain common coital positions should be avoided. For the flexion-intolerant female patient, both variations of fMISS should be avoided, especially fMISS2, as they were shown to elicit the most spine flexion. fQUAD2 and fSIDE are the more spine-sparing coital positions for the flexion-intolerant patient, followed by fQUAD1 (Fig. 2).

It should be noted that the coital positions were performed by participants that did not have a pre-existing disabling back or hip condition, so patients with a low back disorder may have different movement patterns during coitus. This study was intended to provide initial recommendations based on a biomechanical analysis in an area that has not previously been explored – this is a starting point for recommendations to evolve from further research on a back-pained population.

**CONCLUSIONS**

Thus, spine-sparing coitus appears to be possible for the flexion-, extension-, and motion-intolerant patient. Health care practitioners may recommend appropriate coital positions and coach coital movement patterns, such as hip-hinging, to spare the spine.

**REFERENCES**


**Figure 2:** Initial recommendations for female coital positions to avoid (red text) for specific LBP-provoking movements (blue text).

Note: Motions, postures, and loads may exacerbate LBP. Only specific motions were analyzed in this study; therefore, recommendations can only be made for these specific motion intolerances (i.e., flexion-, extension-, and motion-intolerance [in the sagittal plane]) without consideration of spine loads.