Academy of PHYSICAL MEDICINE

Research Paper Review

This review is published with the permission of Research Review Service (www.researchreviewservice.com)

Male spine motion during coitus: Implications for the low back pain patient

Spine 2014; 39(20): 1633-1639

Sidorkewicz N & McGill SM

Reviewed by Dr. Ceara Higgins DC (Research Review Service)

ABSTRACT

Study Design: Repeated measures design.

Objective: To describe male spine movement and posture characteristics during coitus and compare these characteristics across 5 common coital positions.

Summary Of Background Data: Exacerbation of pain during coitus due to coital movements and positions is a prevalent issue reported by low back pain patients. A biomechanical analysis of spine movements and postures during coitus has never been conducted.

Methods: Ten healthy males and females engaged in coitus in the following preselected positions and variations: QUADRUPED, MISSIONARY, and SIDELYING. An optoelectronic motion capture system was used to measure 3-dimensional lumbar spine angles that were normalized to upright standing. To determine whether each coital position had distinct spine kinematic profiles, separate univariate general linear models, followed by Tukey's honestly significant difference post hoc analysis were used. The presentation of coital positions was randomized.

Results: Both variations of QUADRUPED, mQUAD1 and mQUAD2, were found to have a significantly higher cycle speed than mSIDE ($P = 0.043$ and $P = 0.034$, respectively), mMISS1 ($P = 0.003$ and $P = 0.002$, respectively), and mMISS2 ($P = 0.001$ and $P < 0.001$, respectively). Male lumbar spine movement varied depending on the coital position; however, across all positions, the majority of the range of motion used was in flexion. Based on range of motion, the least-to-most recommended positions for a male flexion-intolerant patient are mSIDE, mMISS2, mQUAD2, mMISS1, and mQUAD1.

Conclusion: Initial recommendations-which include specific coital positions to avoid, movement strategies, and role of the partner-were developed for male patients whose low back pain is exacerbated by specific motions and postures.

Level Of Evidence: N/A.

ANALYSIS

Author's Affiliations

Spine Biomechanics Laboratory, Department of Kinesiology, University of Waterloo, Canada.

Background Information

Previous studies have explored sexual activity in individuals with low back pain (LBP) and/or injury, revealing that this population show a marked reduction in coital frequency, with decreases ranging from 34-84% in males (1, 2). As sexual activity has been shown to be an indicator of quality of life (3), it could be considered to be of great impact to those with LBP.

The reported reasons for the decrease in coital activity include both psychological reasons (ex. fear avoidance) and mechanical reasons, with studies showing individuals with LBP report their sex lives causing additional pain in 64%-84% (4, 5). A questionnaire-based study showed marked discomfort during sexual intercourse in 22% of men with LBP (1). These men reported that their main difficulties were in finding a position and with pelvic movements. Studies have also shown that many individuals with LBP have to change the sexual positions they use in order to maintain their sexual activity (6).

This study performed a biomechanical analysis of male spinal movements and posture characteristics during coitus, evaluating five common coital positions.

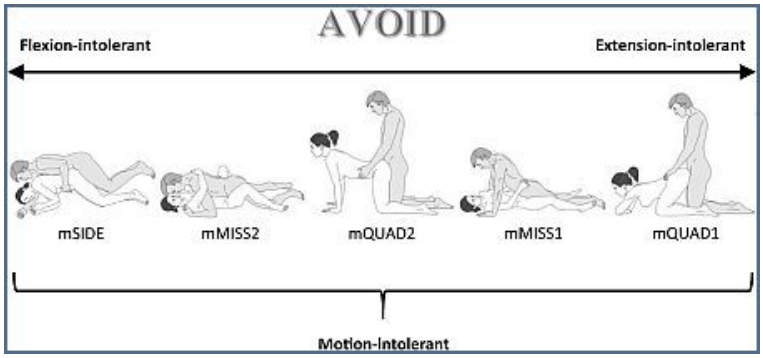
PERTINENT RESULTS

- The majority of kinematic signal was found to be in the sagittal plane (flexion/extension), which are expressed, as negative (flexion) and positive (extension). Thus, only movement in those directions was considered.
- The majority of the range was found to be in flexion across all positions.
- No subject achieved 100% of their spine's active ROM during any coital trial.
- The average rate of penetration cycles was found to be significantly higher in both variations of Quadruped (mQUAD1 and mQUAD2) compared to all other tested positions.
- Amplitude probability distribution function values at 0.0, the lowest spine angle achieved in each coital position, were significantly lower in mSIDE than mQUAD1, mQUAD2, and mMISS1.
- mMISS2 was also significantly lower than mQUAD1, mQUAD2, and mMISS1.
- At values of 0.5, the median spine angle achieved in each coital position, mSIDE was significantly lower than mQUAD1, mQUAD2, mMISS1, and mMISS2. mMISS2 was also significantly lower than mQUAD1.
- At values of 1.0, the highest spine angle achieved in each coital position, mSIDE was significantly lower than mQUAD1 and mMISS1.

CLINICAL APPLICATION & CONCLUSIONS

This study revealed possible demands and risk factors associated with several coital positions for exacerbating specific subgroups of low back pain (LBP). It is important for clinicians to use proper determination of motions and postures eliciting LBP during physical examination in order to properly subcategorize patients and allow for proper recommendations regarding which coital positions may exacerbate their pain.

In patients classified as flexion-intolerant, mSIDE and mMISS2 reached the highest percentages of spinal flexion and fluctuated over the widest range, making them the least spine-conserving positions. In these patients, mQUAD1 and mQUAD2 would be the most spine-sparing, followed by mMISS1. The opposite would be true for extension intolerant patients. This is illustrated in the diagram below.



n motion-intolerant patients, no position from the study would be recommended, but teaching a hip-hinging technique may allow coitus to be more hip-dominant, and therefore, spine-sparing.

It is important to note that subtle changes in posture on behalf of either the male (for example mMISS1 vs mMISS2) or female partner (for example mQUAD1, vs mQUAD2) significantly altered the spinal kinematics. This suggests that the partner could be an integral part of the intervention to reduce low back loads *(EDITOR'S NOTE: I believe they call this 'multimodal care'!)*.

STUDY METHODS

Ten healthy males and ten healthy females with 4.7 (plus or minus 3.9) years of sexual experience with one another were recruited and asked to perform 5 different coital positions in the lab while observed by an electromagnetic motion capture system. The five positions were randomly ordered using a random number generator and pictures of each were posted on the wall of the laboratory to allow participants to refer to the illustrations as needed during data collection. This ensured the participants were performing the positions in the assigned order. As the study had a descriptive nature participants were given very little coaching and told only to "move as naturally as possible".

Exclusion criteria included:

- History of spinal, abdominal, or hip surgery
- Pre-existing disabling back or hip conditions
- Current and relevant musculoskeletal concerns
- Any sexual dysfunction that would prevent them from participating in coitus for the duration of data collection

- Registered student status at the university

Due to the time limitation of 32 seconds for the electromagnetic motion capture system on the female participants, a trial duration of 20 seconds was used. Participants would signal the researcher when they reached what they considered their "natural coital speed and/or rhythm" at which point data collection began.

Previous literature identifying common coital positions for LBP (1, 5, 6) along with commonly recommended positions for LBP (7), and biomechanical rationales were used to influence the choice of positions for the study. The positions included were as follows (see picture above):

1. Quadruped variant 1 – Rear-entry with the female in the quadruped position and the male kneeling behind her. The female supports her upper body with her elbows (mQUAD1)
2. Quadruped variant 2 – As above with the female supporting her upper body with her hands (mQUAD2)
3. Missionary variant 1 – Front-entry with the female lying supine and the male prone on top of her. The male supports his upper body with his hands and the female is minimally flexed at the hip and knees (mMISS1)
4. Missionary variant 2 – As above with the male supporting his upper body with his elbows and the female flexed at the hips and knees (mMISS2)
5. Sidelying – Rear-entry with the female laying on her left side and the male laying on his left side behind her with their hips and knees flexed (mSIDE)

At the end of all coitus trials active range of motion (aROM) of the lumbar spine was measured for each participant in flexion, extension, bilateral lateral flexion, and bilateral rotation. The assumption was made that this represented each participant's maximum range of lumbar spine motion.

8 Optoelectronic motion capture cameras were used to monitor 6 spherical reflective markers located at the participant's skin overlying the right and left acromion, iliac crests, and greater trochanters (these were removed after calibration) and 2 rigid marker clusters, 1 over the spinous process of the 12th Thoracic vertebrae and 1 over the sacrum. Each of the rigid marker clusters contained 5 non-collinear individual reflective markers. All markers were affixed to the skin with adhesive tape. Three-dimensional lumbar spine kinematics were collected continuously throughout the trial at a sample rate of 60 Hz using the Vicon Nexus 1.7 software. The data was used to construct a link-segment model of the torso and the pelvis, which was then used to determine the 3D lumbar spine angles. These were then normalized to the maximum active range of motion measured for each participant and expressed as a percentage of these maximums. Speed of penetration was also calculated using the maximum hip flexion of the male as the starting point of each cycle. Finally, statistical analysis was used to express lumbar spine angular displacement as a percentage of lumbar spine aROM at amplitude probabilities of 0.0, 0.5, and 1.0.

STUDY STRENGTHS / WEAKNESSES

Strengths

- The study used multiple points of data collection.
- Robust data analysis was performed.

- The study fills an important void in the research as many clinicians are unsure of how to counsel their patients with regard to coitus, despite being aware of the significant impact sexual activity can have on quality of life.

Weaknesses

- The study examined spine mechanics in a sample with no pre-existing, disabling back or hip conditions. This may limit the external validity of this study for clinical populations. However, damage to a structure will occur if the loading of the structure exceeds its tolerance (8), so this study is, at the very least, helpful in addressing this issue conceptually in injured populations.
- The current study was limited to males – but a companion paper on females has been published and reviewed.

Additional References

1. Maigne J, Chatellier G. Assessment of sexual activity in patients with back pain compared with patients with neck pain. Clin Orthop Rel Res 2001; 385: 82-87.
2. Akbas NB, Dalbayrak S, Kulcu DG et al. Assessment of sexual dysfunction before and after surgery for lumbar disc herniation. J Neurosurg: Spine 2012; 13: 581-586.
3. Stock SR, Cole DC, Tugwell P et al. Review of applicability of existing functional status measures to the study of workers with musculoskeletal disorders of the neck and upper limb. Am J Industr Med 1996; 29: 679-688.
4. Berg S, Fritzell P, Tropp H. Sex life and sexual function in men and women before and after total disc replacement compared with posterior lumbar fusion. Spine J 2009; 9: 987-994.
5. Monga TN, Monga U, Tan G et al. Coital positions and sexual functioning in patients with chronic pain. Sexuality Disabil 1999; 17: 287-297.
6. Sjogren K, Fugl-Meyer AR. Chronic back pain and sexuality. Internat Rehabil Med 1981; 3: 19-25.
7. White AA, Panjabi MM. Clinical Biomechanics of the Spine. 2nd ed. Philadelphia, PA: J.B. Lippincott Company; 1990.
8. National Research Council and the Institute of Medicine. Musculoskeletal Disorders and the Workplace: Low Back and Upper Extremities. Panel on Musculoskeletal Disorders and the Workplace. Washington, DC: The National Academies Press; 2001.