INTRODUCTION

Sonographic evaluation has been recently gaining significant importance for visualizing musculoskeletal (MSK) structures. It is unique in its value as a dynamic evaluation with the added benefit of safety. A recent publication has shown the validity of ultrasoundography to establish sacral base position and sacral sulcus depth. This showed the potential of sonographic technology to evaluate osteopathic somatic dysfunction, but no one has studied the sonographic measurements of sacral landmarks in different postural position. In our study, we first describe whether in fact sonography can show depth differences of sacral sulcus (SS) and the inferior lateral angle (ILA) of the sacrum in both prone and extended (sphinx) position. In addition to identifying the anatomic landmarks of sacral anatomy, we believe that ultrasound can be used to accurately evaluate physician palpation experience. This is significant since recent studies have shown that assessment of bony anatomical landmark anatomicity may not be a reliable method of palpatory assessment. By comparing the palpation examination of the seasoned osteopathic physicians and the resident physicians to ultrasound imaging findings, we aim to assess the reliability of osteopathic palpatory experience.

METHODS

This study has received UNTHSC Institutional Review Board approval (142051-188) and is ongoing. Our enrollment goal is 40-60 subjects and we have currently recruited and collected data on 16 subjects. After each subject and their chaperone were consented and roomed, the subject were draped appropriately over the exposed sacral area. Then 4 landmarks (bilateral SS and bilateral ILAs) were marked. Each subject had an initial ultrasound measurement of each SS and ILA both in a prone and sphinx position. Then 5 examiners comprised of 3 senior osteopathic physicians and 2 osteopathic residents, palpated and evaluated each marked landmark for asymmetry, again in prone and sphinx positions. The designated sacral bony landmarks were floated the ultrasound probe to ensure appropriate depth using the ultrasound probe before capturing the images.

RESULTS

The preliminary data collected with 16 enrolled subjects were analyzed thus far. Ultrasound measurements revealed mean left to right depth difference ranging from 0.38-0.62cm between the SS position, the mean depth difference was 0.23 ± 0.06cm (±0.46-0.68). Sonography before and after physician palpation showed a depth difference of the designated landmarks range from 0.37-0.70cm (±0.6-0.42). Physician palpation data have not shown a high degree of interrater reliability with the 16 subjects studied.

Figure 3

First 2 columns represent physician palpation data for the prone position only. The number represents how many physician raters were in agreement. Only the palpation data from prone position were included in this example due to high number of physicians in agreement (4 or 5). So far, we do not seem to have the evidence to support interrater reliability of palpation amongst physicians.

Last 4 columns are the calculated depth differences between left to right sacral landmarks. This shows that the depth difference maybe greater in prone position compared to the sphinx position.

Figure 4

This chart shows the mean depth differences of each designated sacral bony landmark in prone and sphinx positions measured by sonography. This suggests that both ILA and SS move anterior when the subjects are transitioned from prone position to sphinx.

Figure 5

This chart shows mean values of ultrasound measured depth differences between each sacral bony landmarks before and after physician palpation. Ablot small (ranging from 0.03cm to 0.25cm) these depth changes of the sacral bony landmarks still occurred despite the instructions given to the physicians not to move the palpation and use light touch.

CONCLUSIONS

Our study is on going, but so far we are able to validate that ultrasound can identify depth differences of the sacral sulcus and the ILA. Sonography has demonstrated that the depth of the sacral landmarks change from prone to sphinx position. It is important to note that the ultrasound measurements we collected so far has shown that palpation may be relative anterior movement of the sacrum at both the sacral sulcus and ILA when the subjects are in a sphinx position. This is important to study further as an ongoing osteopathic tests maintain that the sphinx position causes the sacral base to move anterior while the ILAs move posterior. Sonography also has demonstrated that before and after physician palpation demonstrated that repeated palpation of bony landmarks may change sacral positioning. Further data collection will be needed to adequately understand physician palpatory experience.

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REFERENCE

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