

A photograph of a person's back, showing the lower torso and upper legs. The person is wearing a white sports bra and grey athletic shorts. Their hands are placed on their hips. Overlaid on the lower back area is the text 'Is Anterior Pelvic Tilt a Thing?' in white. There are also white arrows pointing towards the text from the sides.

**Is Anterior  
Pelvic Tilt**

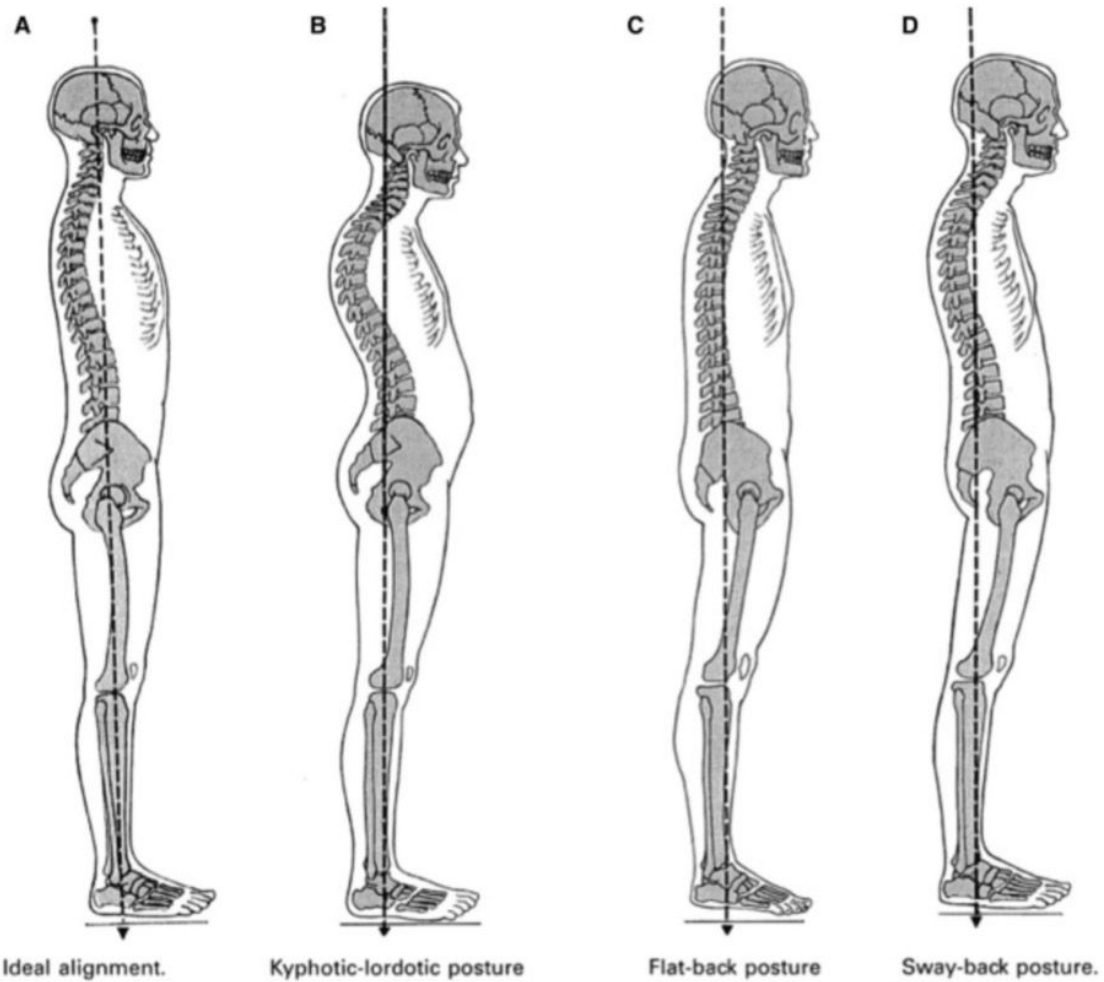
**a Thing?**



# Learning goals

1. Pelvic tilt doesn't tell us anything about muscle balance
2. Pelvises are not symmetrical
3. We can't measure pelvic tilt by hand even though we think we can
4. 80% of pain-free people have anterior pelvic tilt
5. Anterior pelvic tilt is not associated with low back pain





**Figure 1** The 4 postural types defined according to the classification of Kendall. (A) Ideal alignment. (B) Kyphotic-lordotic posture. (C) Flat-back posture. (D) Sway-back posture. (Reprinted from Kendall FP, McCreary EK, Provance PG, Rodgers MM, Romani WA. *Muscles: testing and function, with posture and pain*. 5th ed. Baltimore, MD: Lippincott Williams & Wilkins; 2005)

Were you taught something like this?

Image source: Kendall, F. P., McCreary, E. K., Provance, P. G., & Abeloff, D. K. (1993). *Muscles: testing and function*.



Ear canal

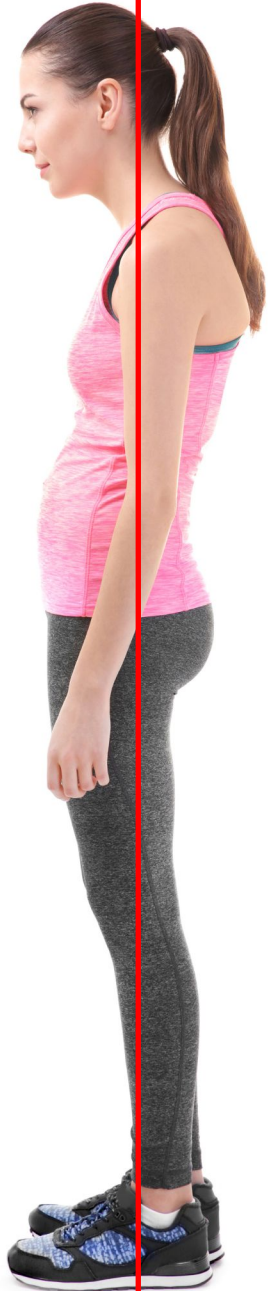
Acromion process

Greater trochanter

Middle of knee

Front of ankle bone

# Posture assessment



# Posture assessment



But is it true?





Pelvic tilt doesn't  
tell us anything  
about muscle  
balance



# Lumbar lordosis & pelvic tilt are unrelated to abdominal strength

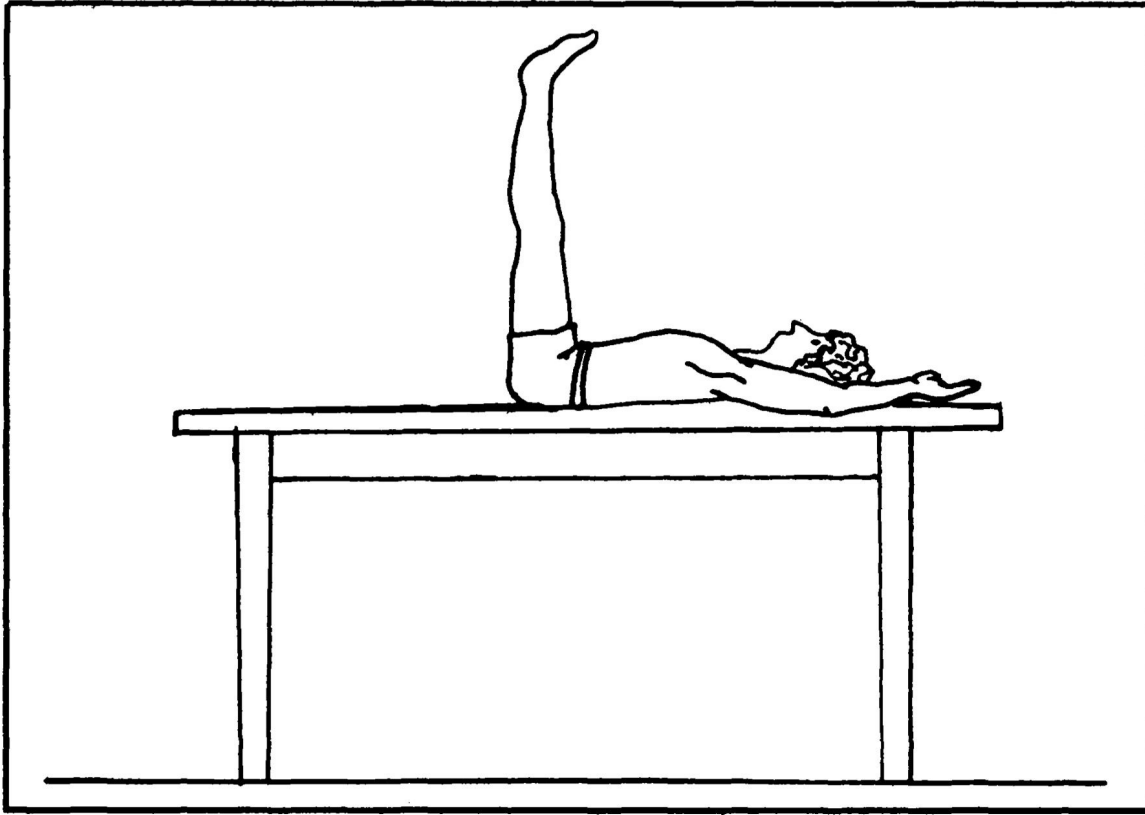
Walker, M. L., Rothstein, J. M., Finucane, S. D., & Lamb, R. L. (1987). Relationships between lumbar lordosis, pelvic tilt, and abdominal muscle performance. *Physical therapy*, 67(4), 512-516. <https://be-research-papers.s3.amazonaws.com/Diploma+lecture+research+papers/Lecture+18+Spinal+assessment+pt+1/Walker-1987-Relationships+between+lumbar+lordo.pdf>





# Hip & spine flexibility & strength are not related to lumbar lordosis

Elliott, B. J., Hookway, N., Tate, B. M., & Hines, M. G. (2021). Does passive hip stiffness or range of motion correlate with spinal curvature and posture during quiet standing? *Gait & Posture*, 85, 273-279.



**Fig. 3.** Starting position for testing abdominal muscle performance.

No change in  
pelvic tilt or  
lumbar lordosis  
after 8 weeks of  
abdominal  
strengthening

Levine, D., Walker, J. R., & Tillman, L. J. (1997). The effect of abdominal muscle strengthening on pelvic tilt and lumbar lordosis. *Physiotherapy theory and practice*, 13(3), 217-226. <https://be-research-papers.s3.amazonaws.com/Diploma+lecture+research+papers/Lecture+18+Spinal+assessment+pt+1/Levine-1997-The+effect+of+abdominal+muscle+str.pdf>

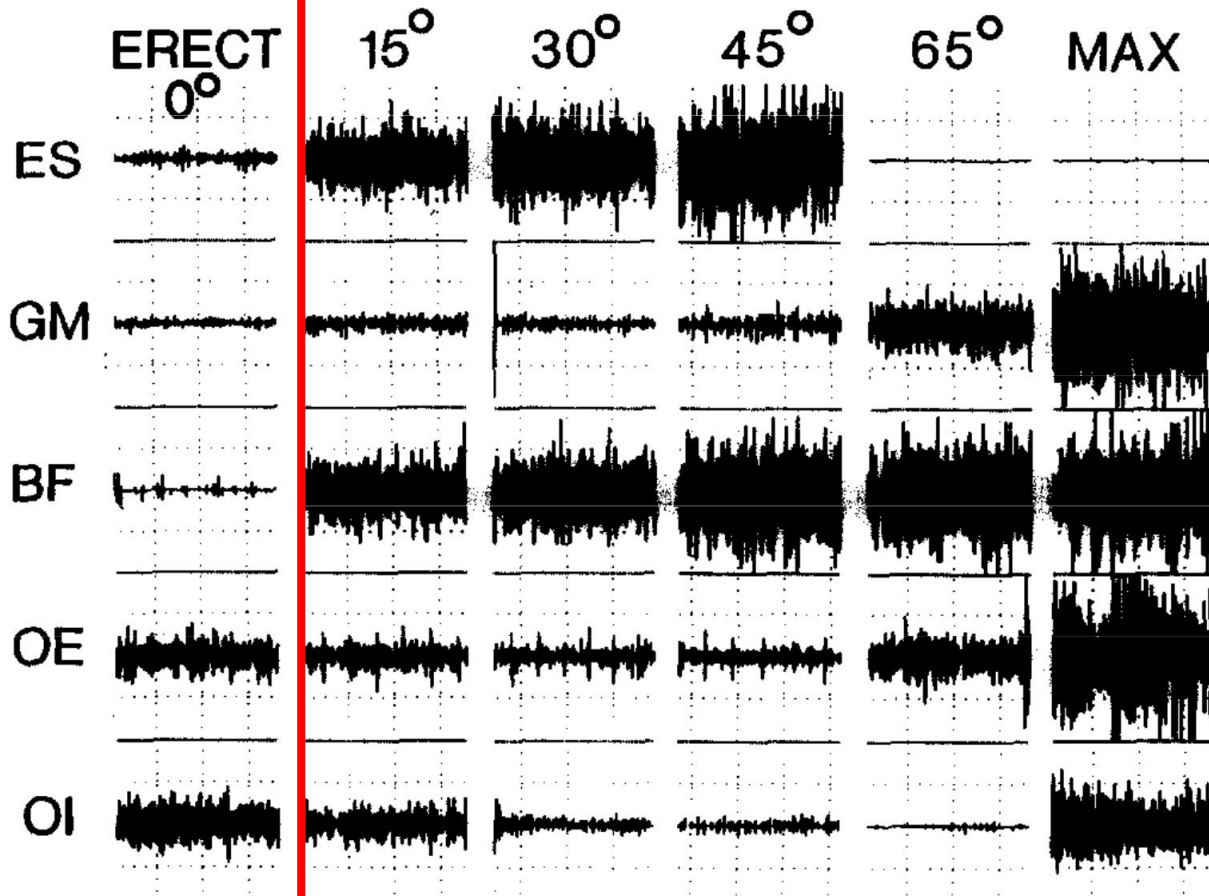


# Hamstring stretching increases PSLR but does not change pelvic tilt

PSLR = passive straight leg raise

Li, Y., McClure, P. W., & Pratt, N. (1996). The effect of hamstring muscle stretching on standing posture and on lumbar and hip motions during forward bending. *Physical therapy*, 76(8), 836-845. <https://be-research-papers.s3.amazonaws.com/Diploma+lecture+research+papers/Lecture+18+Spinal+assessment+pt+1/Li-1996-The+effect+of+hamstring+muscle+stretch.pdf>





Erector spinae,  
gluteus maximus  
& hamstrings are  
inactive in erect  
standing

Snijders, C., Bakker, M., Vleeming, A., Stoeckart, R., & Stam, H. (1995).  
Oblique abdominal muscle activity in standing and in sitting on hard  
and soft seats. *Clinical Biomechanics*, 10(2), 73-78. [https://be-research-  
papers.s3.amazonaws.com/Diploma+lecture+research+papers/Lecture+18+Spinal+assessment+pt+1/Sadler-2019-  
Gluteus+medius+muscle+function+in.pdf](https://be-research-papers.s3.amazonaws.com/Diploma+lecture+research+papers/Lecture+18+Spinal+assessment+pt+1/Sadler-2019-Gluteus+medius+muscle+function+in.pdf)





Why tight  
hamstrings do  
not limit your  
ability to stand  
in neutral

\*No skeletons were harmed in the  
making of this slide





# Hip stiffness does not correlate with lumbar lordosis

Elliott, B. J., Hookway, N., Tate, B. M., & Hines, M. G. (2021). Does passive hip stiffness or range of motion correlate with spinal curvature and posture during quiet standing? *Gait & Posture*, 85, 273-279.



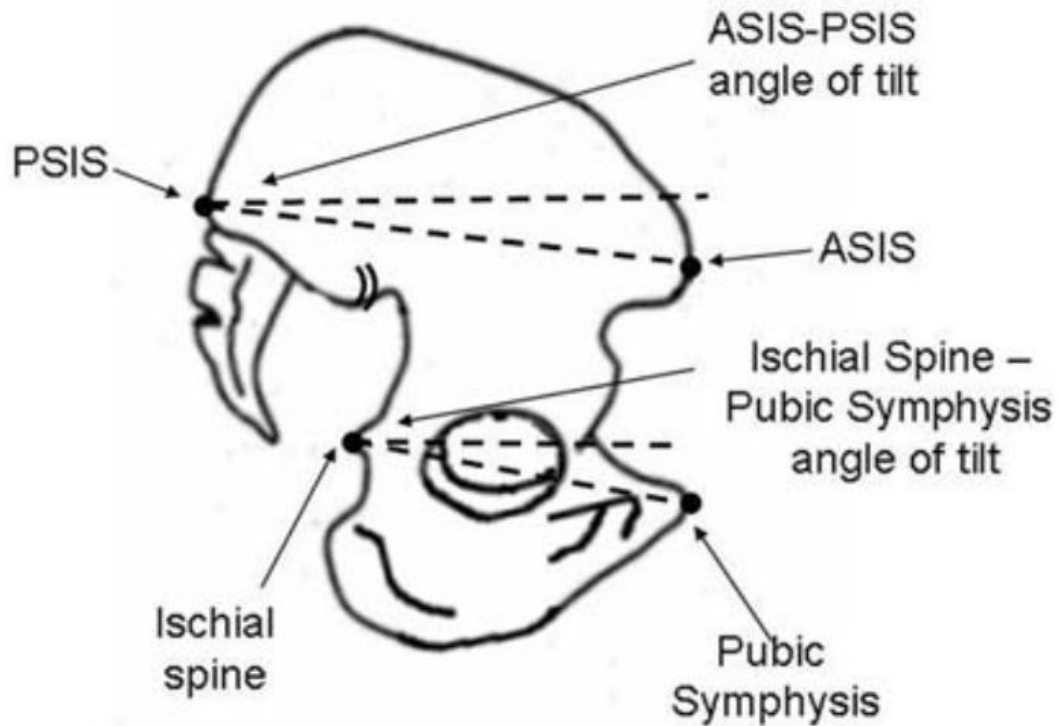


## Self-test

- True/False: Pelvic tilt correlates with abdominal strength
- True/False: Pelvic tilt correlates with hamstring and lower back strength & flexibility
- What effect does 8 weeks of abdominal strengthening have on pelvic tilt?
- What effect does hamstring stretching have on pelvic tilt?



Pelvises are not  
symmetrical



## Normal variation

- 7-9mm difference in innominate size L-R
- ASIS-PSIS angle up to 23°
- 11° difference in ASIS-PSIS angle L-R
- No difference in ASIS-PSIS angle between female & male

Preece, S. J., Willan, P., Nester, C. J., Graham-Smith, P., Herrington, L., & Bowker, P. (2008). Variation in Pelvic Morphology May Prevent the Identification of Anterior Pelvic Tilt. *The Journal of Manual & Manipulative Therapy*, 16(2), 113-117. <https://be-research-papers.s3.amazonaws.com/Back+pain/Variation+in+Pelvic+Morphology+May+Preece-2008.pdf>



**Iliac crest**

**ASIS**

**PSIS**

**Pubic symphysis**



## Self-test

- True/False: Pelvises are symmetrical
- Which bony landmarks vary in height between pelvises?
- If you measure one ASIS as higher than the other what does that tell you?

## Conclusion

The use of lumbo-pelvic landmark palpation does not reach clinically acceptable levels of validity; however, heterogeneity in the included studies' methods and data

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Journal Pre-proof

reporting limited between trial comparisons. These results accord with other reviews and suggest the necessity of a shift away from over-reliance on landmark palpation to align manual therapy with practise guidelines.

Even though we think we can, we can't accurately palpate bony landmarks

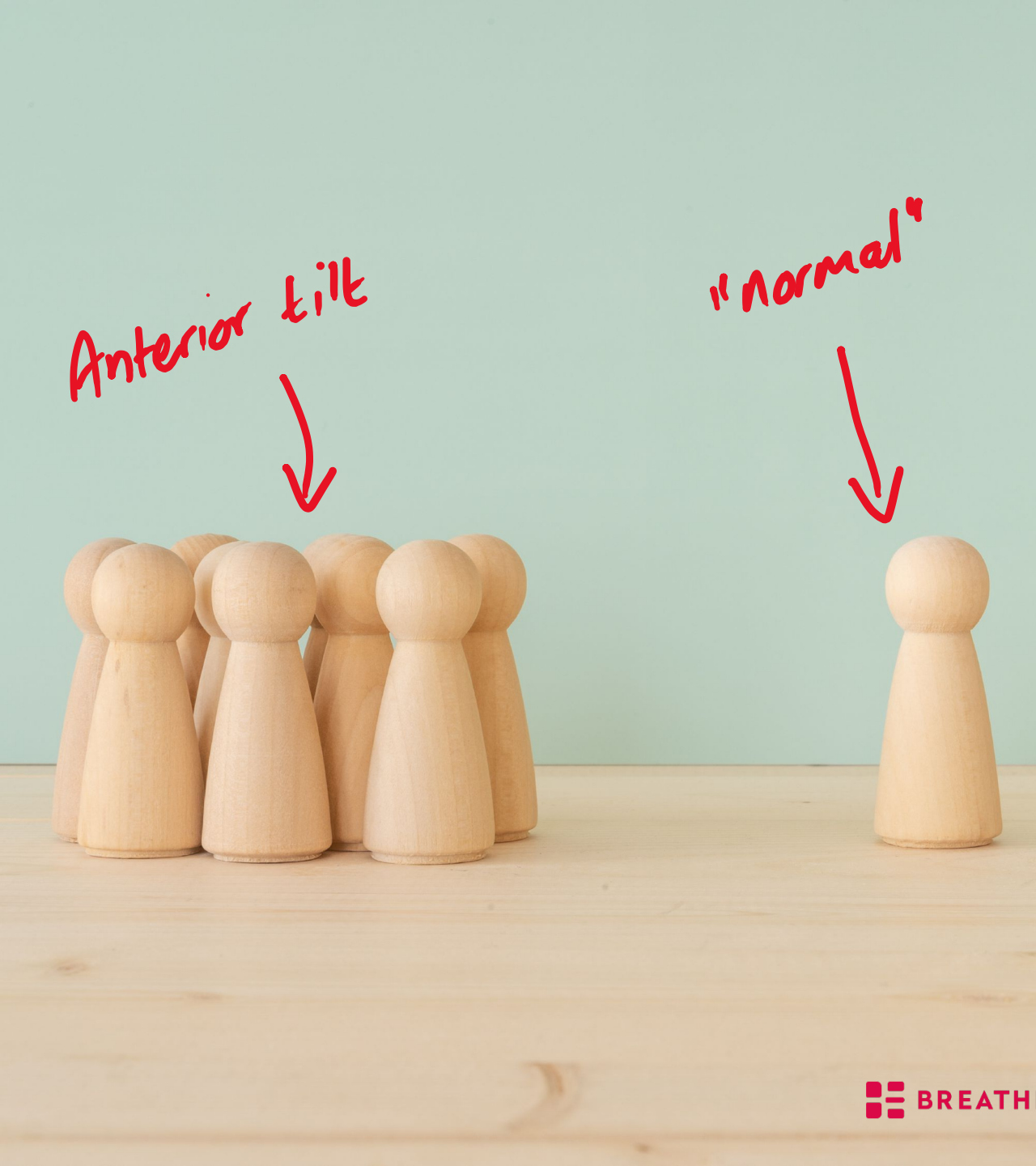
Alexander, N., Rastelli, A., Webb, T., & Rajendran, D. (2020). The validity of lumbo-pelvic landmark palpation by manual practitioners: a systematic review. International Journal of Osteopathic Medicine. <https://be-research-papers.s3.amazonaws.com/Diploma+lecture+research+papers/Lecture+17+Sciatica+pt+2/Alexander-2020-The+validity+of+lumbo-pelvic+la.pdf>





## Self-test

- True/False: Humans can accurately palpate pelvic bony landmarks
- True/False: Guidelines recommend use of manual palpation to locate bony landmarks



80% of pain-free  
people have  
anterior pelvic tilt

So is it really a “tilt” or is it just normal?

Herrington, L. (2011). Assessment of the degree of pelvic tilt within a normal asymptomatic population. *Manual Therapy*, 16(6), 646-648. <https://be-lecture-notes.s3.amazonaws.com/Herrington-2011-Assessment%20of%20the%20degree%20of%20pe.pdf>





## Self-test

- What percentage of pain-free people have anterior pelvic tilt?





# LBP is associated with flattened lumbar lordosis

Chun, S.-W., Lim, C.-Y., Kim, K., Hwang, J., & Chung, S. G. (2017). The relationships between low back pain and lumbar lordosis: a systematic review and meta-analysis. The Spine Journal. <https://be-research-papers.s3.amazonaws.com/Diploma+lecture+research+papers/Lecture+18+Spinal+assessment+pt+1/Chun-2017-The+relationships+between+low+back+p.pdf>



But when we do  
stuff to increase  
lordosis it doesn't  
change pain

Swain, C. T., Pan, F., Owen, P. J., Schmidt, H., & Belavy, D. L. (2020). No consensus on causality of spine postures or physical exposure and low back pain: A systematic review of systematic reviews. *Journal of Biomechanics*, 102, 109312. <https://be-research-papers.s3.amazonaws.com/Diploma+lecture+research+papers/Lecture+17+Sciatica+pt+2/Swain-2020-No+consensus+on+causality+of+spine.pdf>



## Self-test

- True/False: Anterior pelvic tilt is associated with low back pain
- Is any pelvic alignment associated with low back pain?
- What happens to low back pain when we do exercises to increase anterior pelvic tilt?





# Learning goals

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Questions?

