

To what extent lumbopelvic posture influences the myoelectric silence of the erector spinae during trunk flexion

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BACKGROUND

- The trunk flexion is a common movement in daily life that involves the flexion of the spine and the rotation of the pelvis (around the hip joint) (Figure 1).
- The appearance of the myoelectric relaxation (silence) of the erector spinae occurs nearby spine full flexion, then, the load is supported by spinal soft tissues (Figure 1).
- The risk of injury on the spine tissues increases when the trunk goes into extreme ranges of flexion.

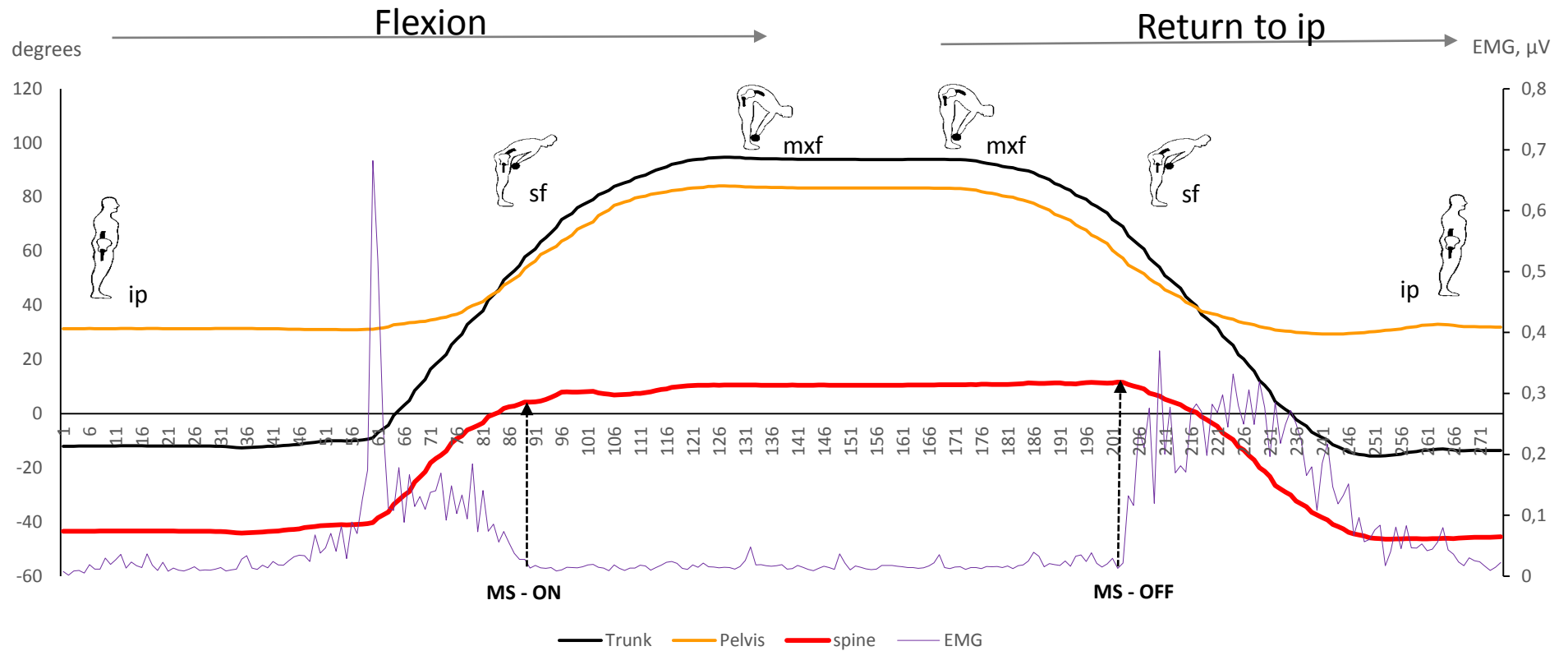


Figure 1. Initial posture (ip). Spine flexion (sf). Maximum trunk flexion (mxf). Myoelectric silence (MS) ON and OFF

OBJECTIVE

To determine whether the occurrence of the myoelectric silence of the erector spinae during trunk flexion movement is related to the lumbopelvic posture in upright standing.

MATERIALS AND METHODS

Subjects characteristics

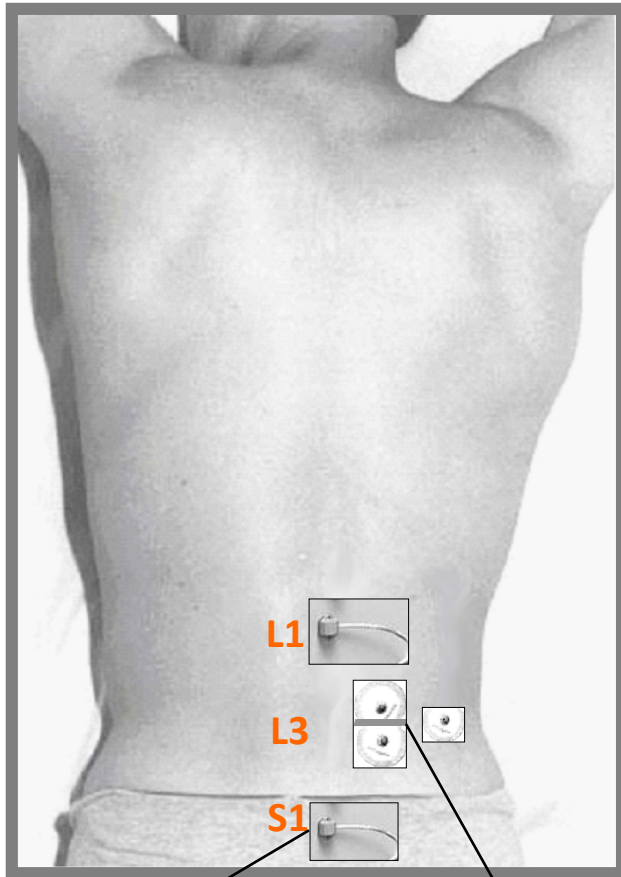
SUBJECTS	GENDER	AGE	WEIGHT	HEIGHT	BMI
42 asymptomatic	19 men; 23 women	23.78 (3.86)	64.49 (9.72)	1.67 (0.08)	22.79 (2.48)

* Average (SD)

DATA ACQUISITION

Lumbar curvature (LC) and sacral inclination (SI), in relaxed upright stance, and lumbar motion during forward bending were calculated in the sagittal plane with an electro-goniometer (degrees). (Figure 2)

During sagittal flexion, the lumbar spine angular displacement was recorded continuously and simultaneously with the surface EMG (μV) from the right erector spinae at L3. (Figure 2)



Motion sensors

Surface electrodes (EMG)

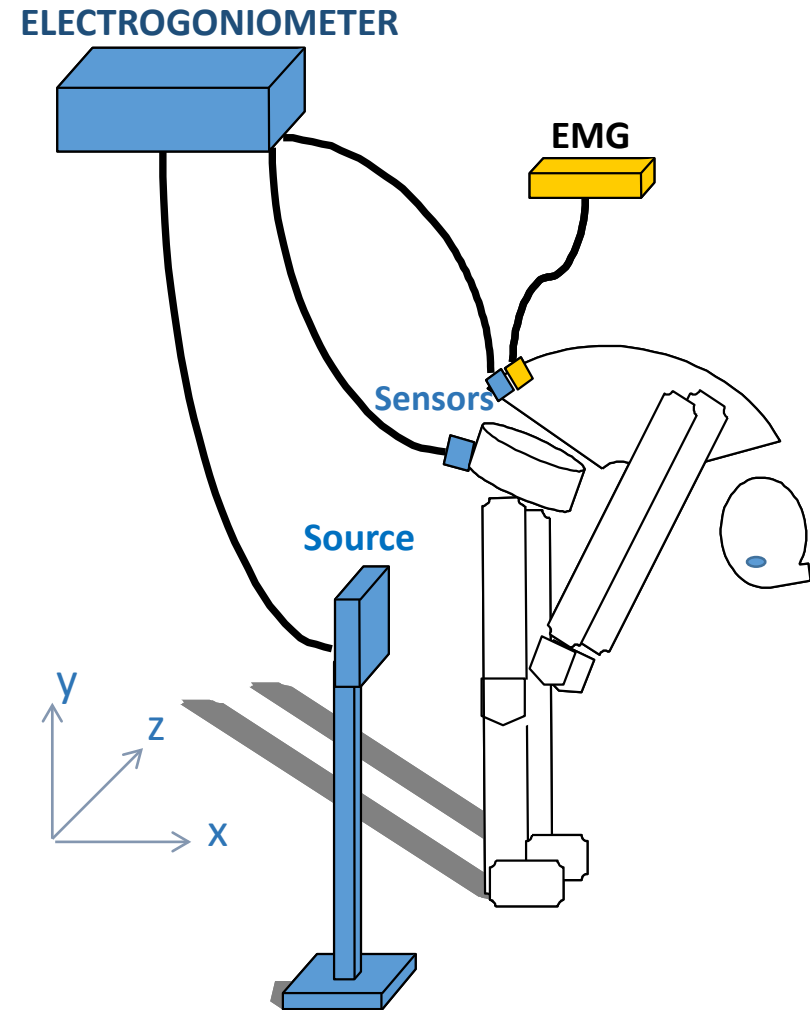


Figure 2

RESULTS

Upright standing

Lumbar curvature (LC) : [average (SD)] -40.2° (16.9°)
 Sacral inclination (SI) : [average (SD)] 20.4° (15.1°)

Start of the myoelectric silence

Range of spine flexion [average (SD)]
 51.3° (11.4°)
 87.3% (10.2%)

Correlation between average values of LC and SI in upright standing and the range of lumbar spine flexion at myoelectric silence start

r	r ²	Standard error	P value
0.69	0.48	8.44	< .000

CONCLUSIONS

- The start of the myoelectric silence of the erector spinae in terms of the spine flexion could be explained up to 50% by the lumbopelvic posture in standing.
- To predict the appearance of the myoelectric silence of the erector spinae from lumbopelvic posture may be useful as a preventative measure in clinical and surgical settings.

DISCLOSURE

Nothing to disclose