MODULE BIOMECHANICS OF SPINE

Didactic Unit C: HOW DO I ASSESS SPINE?

C.3. What are the advantages of the use of instrumental techniques versus scales and physical examination in spine?

CLASS ACTIVITY:

PATIENT'S FILE PART 2

Michael. Male, 60y

Past medical history: left chronic recurrent sciatica

BIOMECHANICAL EVALUATION

1. LUMBAR SPINE RANGE OF MOTION

Table 1. Mobility of the lumbar spine in degrees, measured by means of 2 inclinometers. (ROM: active range of motion; LoM: loss of mobility)

	ROM (º)	LoM comparing to AMA
Flexion	57º	0%
Extension	20º	0%
Lateral flexion (left)	23º	23%
Lateral flexion (right)	25º	17%

In the previous table we can see an active range of motion of 57º and 20º for lumbar flexion and extension respectively, which in both cases is normal when compared to the American Medical Association (AMA) normative databases. There is a slight decrease of the lateral flexions compared to these very values from the AMA.

2. LIFTING WEIGHT FROM A GROUND LEVEL

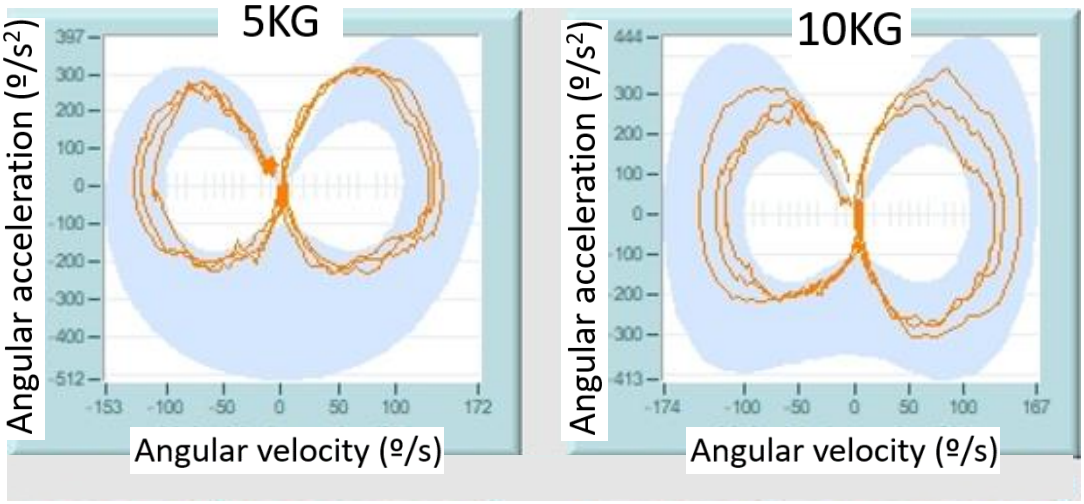

Figure 1 (up). Graphic showing changes of speed and acceleration of the trunk during the lifting of a 5kilograms box (first picture) and a 10 kg box (second picture). The weight is lifted from the floor with both hands and lifted up to the chest level while standing up. The orange red corresponds to the movement performed by the patient, which is similar to the movement performed by healthy subjects (represented by the blue shaded area).

Figure 2(up). Activity of lifting weights measured.

Table 2 (down). This table shows the parameters measured while performing the activity afore mentioned (lifting weights). These parameters are related to time, velocity, acceleration, lumbar range of motion and trunk mobility. The results are shown as "raw" parameters in the pertinent measurement unit, and in % of normality compared to a normative database (healthy people performing the same activity, age and gender equal to those of our patient). Percentages of 90% or more mean that the parameter obtained is similar to healthy subjects' parameters (thus, the percentages are shown in green when normal).

	5 Kg		10 Kg	
Total time (s)	1.8	98%	1.6	100%
Maximum vertical force (%)	123.9	95%	131.8	100%
Lumbar mobility (º)	43.0	100%	37.6	100%
Trunk inclination (º)	41.3	82%	42.4	79%
Trunk rotation (º)	4.6	100%	4.4	100%
Max. Angular velocity (trunk flexion) (º/s)	134.2	100%	139.6	100%
Max. Angular velocity (trunk flexion) (º/s^2)	316.7	100%	314.4	100%
Max. Angular velocity (trunk extension) (º/s)	-120.7	100%	-129.1	100%
Max. Angular velocity (trunk extension) (º/s^2)	-217.1	100%	-216.1	100%