ELECTROMYOGRAPHICAL AND MECHANICAL PARAMETERS EVOLUTION ON A EVER CHANGING SADDLE.

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INTRODUCTION

The objective of this research was to study the effect of an experimental cycle saddle (developed by the society "hurrycat[1]") on mechanical and electromyographics parameters. This saddle present three different positions:

- Advanced particularly adapted to the ascent
- Indifferent for the flat
- And decline more appropriate for the descent.

MATERIAL AND METHODS

The VTT was balanced on a force plate to determine the evolution of center of gravity. Force and torque were recorded on seven men [24± 6 years, 181± 4cm, 76.9± 7 Kg] in static position at three different slope : 5, 10 and 15 % in ascent (position indifferent versus advanced) and 10, 20, 30% for the descent (position indifferent versus decline). Bipolar surface electromyography (EMG) was used to assess the level of electrical activity for vastus lateralis (VL), vastus medialis (VM), hamstrings, flexor carpi radialis (Fr), trapezius, deltoidus, and iliocostalis lumborum (Il) Signals were recorded using a myodata system at 2048 Hz. The root mean square (RMS) value of the EMG was calculated using the raw signal collected throughout the entire eccentric and concentric phases of the movement. All data were normalised by dividing the recorded value by the RMS value of the maximal voluntary contraction (MVC). Subjects performed during 15 minutes for the three different slope in ascent a continuous test at 70% of their maximal cardiac frequency.

RESULTS

Figure 1 represent the evolution of the centre of gravity towards indifferent positions for the three different slope.

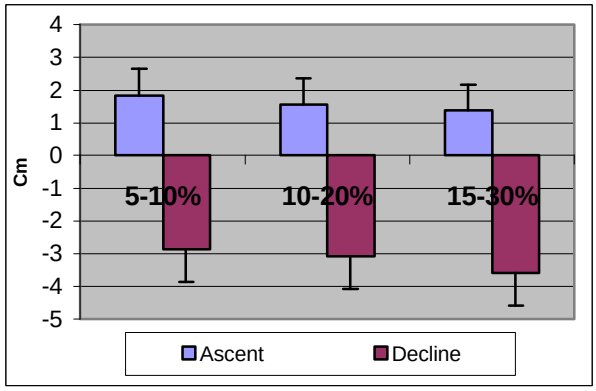

***Figure 1** : Centre of gravity evolution towards indifferent position for the three slopes.*

The translation of the centre of gravity is important for the decline and increases with the slope (-2,8 cm at 10% and –3,6 at 30%) whereas for the ascent it decrease with the slope (1,8 cm at 5% and 1,3 cm at 15%).

Table 1 sum up the drop (in percentage) of the RMS value for the muscles iliocostalis lumborum (Il) and flexor carpi radialis (Fr) between the indifferent and advanced position for the ascent and indifferent and decline position for the descent.

	Ascent			Descent		
	5%	***10%***	***15%***	***10%***	***20%***	***30%***
Il	6,4%	12,7%	5,7%	10,6%	4,6%	10,4%
Fr	9,3%	8,1%	12,1%	8,3%	17,4%	10,3%

***Table 1**: Drop of the RMS value for the two muscles.*

DISCUSSION

One indicator of neuromuscular fatigue is the increase of the RMS value that occurs when a muscle performs a continuous fatiguing work. The drop in the RMS value is certainly associated with a less activation muscular [1,2]. It is interest to notice the two muscles which present this evolution are postural muscles. This must be taken for more efficiency and a best ergonomic position. In addition the movement of centre gravity is nature as affect efficiency particularly in descent.

REFERENCES

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