

Technical system for ankle rehabilitation and increase joint performances

Radu Mihai Iacob¹, Emil Budescu², Virgil Atanasiu²

Knowing the biomechanical parameters influencing the injuries and the performances of the ankle provides the possibility to project and realize technical systems for rehabilitation and training, acting with maximum effect over the ligaments and Achilles tendon from this joint level. So, for the technical system the functional parameters could be determined, allowing us to obtain stated values for the influencing biomechanical parameters, obtaining the functions of interdependency between the functional parameters of the technical system and the biomechanical ones of the rehabilitated or trained joint.

A mechanism necessary for medical recuperation and sportive training, at the level of the level of ankle joint, has to have the possibility to perform an oscillator controlled movement towards the median-lateral axes and respectively towards the anterior-posterior axes to provide to the leg a passive movement (mobility) of plantar-dorsal and inversion-reversion flexion. The manufacturing simplicity is the one offering also a good friability, aiming to obtain a mobile platform, having the possibility to adjust the oscillation angles and to have a constructive scheme as simple as possible.

The mechanism proposed to rehabilitate and train the ankle is presented in figure 1. The figure 2 presents an image of the manufactured oscillating platform prototype.

According to the structural scheme, the oblique bar forms in its movement two identical cones, with their tips on the rotation axe, symmetrically disposed related with a fix point on the rotation axe and having the oblique bar as the same generator, as can be noticed in figure 3.

The functional parameters for the oscillate platform are: the pitch of the generator bar of the two cons, angle noted with δ and the rotation angular speed ω . These two parameters are variable, the pitch angle of the bar can be modified by adjusting the distance between the two rotation camps, and the angular speed having a preset value adjusted by the pacient or the sportiv using this device, from the suportability condition of the physical exercise.

This paper could be found useful for sportive and trainers, but also for patients in the joint rehabilitation phase and kinetoterapeuts.

¹University "Al. I. Cuza" of Iasi, Faculty of Physical Education and Sports, Romania.

²Technical University "Gh. Asachi" of Iasi, Biomechanics Laboratory, Romania.

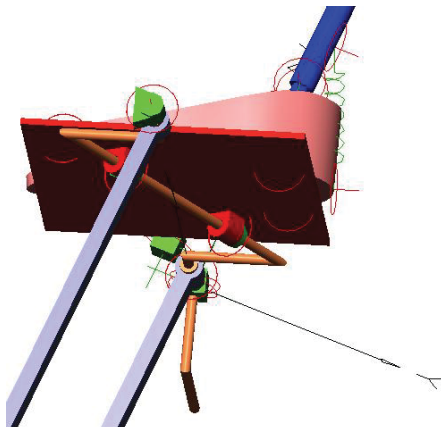


Figure 1: The cinematic scheme of the oscillator platform



Figure 2: The prototype of the oscillator platform

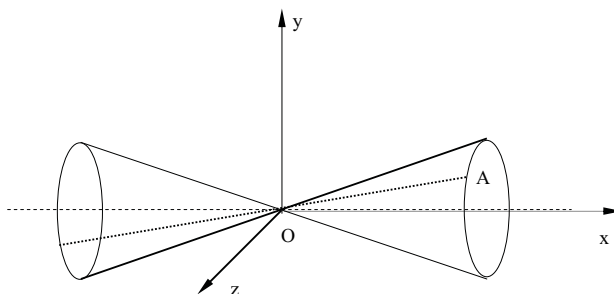


Figure 3: The oblique bar trajectory

