

## PROPRIOCEPTIVE EVALUATION OF A GROUP OF RUNNERS BEFORE AND AFTER TRAINING

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### Introduction

One of the end results of daily practice of a given athletic movement, and exercises aimed at maximizing its performance, is that proprioceptive reflexes associated with the specific movement are trained in order to obtain optimal joint control through perfect muscle use.

Recent studies have shown that functional stability of the lower limb and its joints depends on the person experiencing high frequency situations of micro-instability of the support base. Thus, high frequency destabilization of the support base through specific proprioceptive exercises, such as running on uneven ground, makes the whole lower limb more stable and prevents injuries. This study investigates how athletic training of a group of runners could influence proprioceptive sensitivity in athletes.

### Materials and methods

Thirty athletes (mean age 26.5 years), from the athletic society of S.Colombano al Lambro (Mi) were evaluated in two different sessions 6 weeks apart, before and after their training.

Each athlete performed their proprioceptive training (both static and dynamic) for 30 minutes a day, five days a week, together with their specific running exercises. These parts consist of slow running and jump. The first evaluation was carried out before the beginning of the season games, after a month of daily activities, when the athlete programme had already finished.

The assessment of proprioception was carried out instrumentally on both lower limbs using a biofeedback system for analyzing and treating proprioceptive disorders (Pro-kin PK 254; TecnoBody, Bergamo, Italy). After having placed the limb (first the right and then the left) on a mobile platform, the subject was asked to trace, with a cursor controlled by the movements of the platform, the routes shown on the screen of a connected computer. The routes were two straight lines, one on a sagittal plane, the other on a transverse plane, and a circle. The subject was asked to complete the test as quickly as possible and as well as possible, by tracing the line of the defined routes and also tracing the objectives placed along the route. The parameters considered were: the **time** (s) taken to carry out the test.

### Results

	Sagittal trace	Transverse trace	Circular trace
<b>Initial test (s)</b>	<b>21.5 ± 8.8</b>	<b>15.2 ± 5.6</b>	<b>31.9 ± 8.5</b>
<b>Final test (s)</b>	<b>11.5 ± 5.1</b>	<b>9.1 ± 3.4</b>	<b>22.3 ± 4.9</b>
<b>Statistical significance of difference</b>	<b>P&lt; .000454</b>	<b>P&lt; .000130</b>	<b>P&lt; .002476</b>

### Discussion and conclusions

A first comparison of the various results in the table shows that all the runners took longer to complete the test at the initial evaluation than at the final evaluation 6 weeks later. Furthermore, the t-test, used to establish the statistical significance of any differences, showed that the improvements were strongly significant.

It can be concluded that athletic training, carried out with a certain regularity, can improve



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proprioceptive sensitivity, facilitating afferent nerve pathways starting from the peripheral receptors.

Proprioceptive exercises are usually prescribed for athletes who must recover function altered by structural lesions, trauma or immobility. However, in the light of these results and clinical experience, we believe that these exercises should become an integral part of training programs even

for healthy athletes, particularly those involved in sports such as running in which the stability of the support base and recognition and immediate response to situations of imbalance must be managed with extreme accuracy and precision.

### **References**

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