

# Hamstring Asymmetric Maximum Force Assessment with DINABANG

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## INTRODUCTION

The most common injuries in sports occur in the lower extremities where hamstring is the most common location [1]. Analysis of lower limb asymmetry is important to determine because it entails higher injury risk [2] and decreases performance in athletes. Asymmetry below 10% is commonly reported in non-injured athletes, assessments between 10% and 15% could compromise the athlete's performance and predispose to injuries [3]. Above 15% asymmetry is not compatible with normal sport activity.

The purpose of this paper is to introduce DINABANG® [4], a new device for evaluate muscle force asymmetry of the lower limb

## MATERIAL AND METHODS

70 athletes (25.3 ± 6.7 years, 72.2 ± 11.1 Kg men & 62.3 ± 5.4 Kg, 26.0 ± 5.6 years women) of different sport disciplines took part and signed an informed consent. Subjects were asked to push their leg towards extended hip with fully extended knee, in supine position (Fig. 1). This motor task was performed while the Physical Therapist held an ankle-secured rubber band. This task was repeated three times for each limb. We analyzed the Robinson asymmetry index [3] of the dominant member with respect to the non-dominant.



Figure 1. DINABANG® instrument during isometric force evaluation. Supine position of amateur sportsperson with hip at 60° and the leg is pushed towards 0°, tending to extend the hip with fully extended knee.

## RESULTS

Fig. 2 shows the asymmetry of the Hamstring strength of 70 amateur athletes. Our population includes 4 outliers with 28-30% of asymmetry: 2 with stronger dominant limb and 2 with non-dominant stronger limb. Excluding outliers, 16% (11 athletes) appear as asymmetric with stronger dominant limb and 6% (4 athletes) with stronger non dominant limb. No significant differences were found between dominant ratios of men and women.

## REFERENCES

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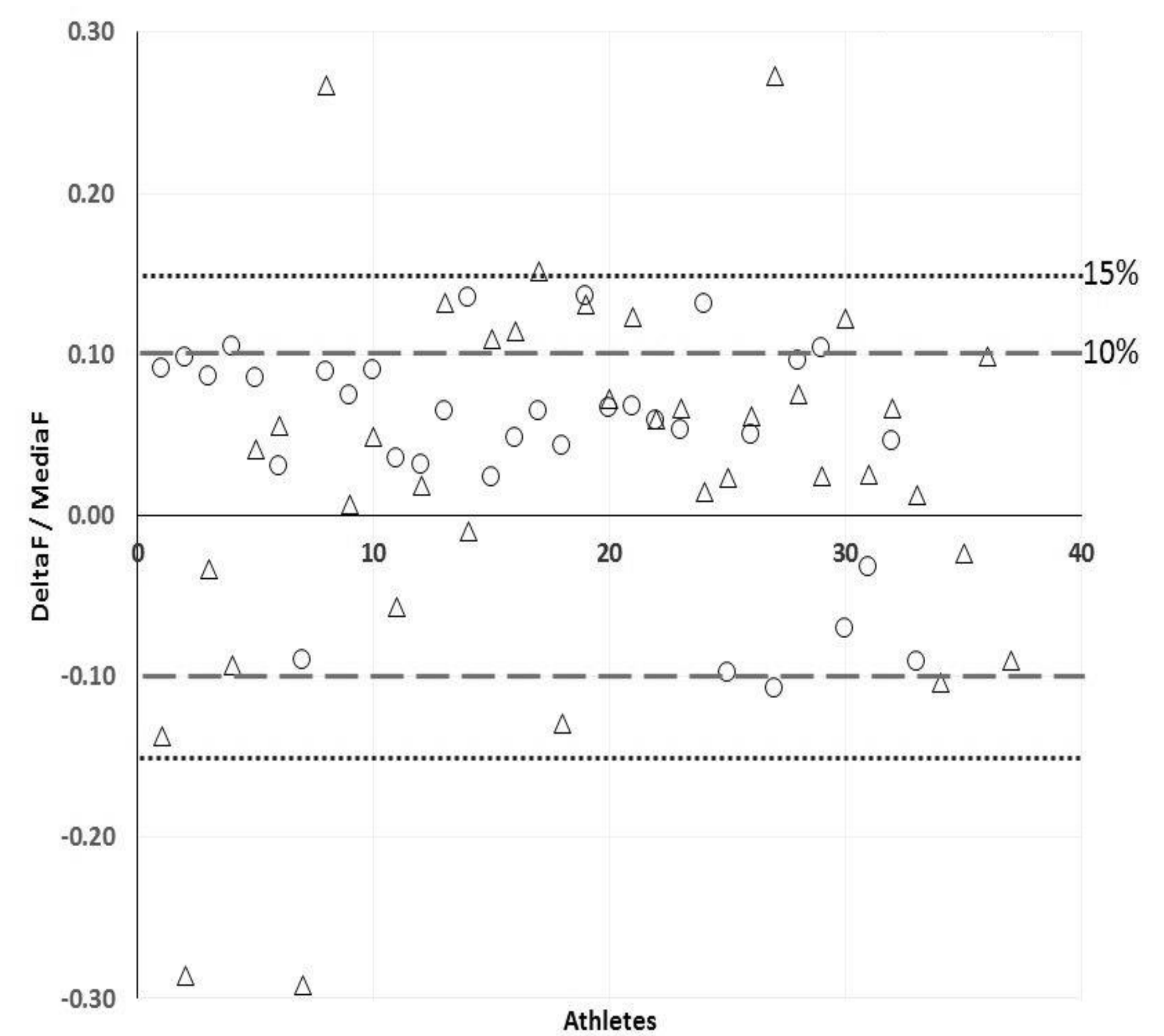


Figure 2. Asymmetry index DeltaF/MediaF of the 70 athletes. This is an important contribution of DINABANG® because it allows the coach to quickly detect any asymmetries. Values from 0 to 0.10 represent symmetry. Values from above 0.15 represent risk of injury

## DISCUSSION

Efficient rehabilitation and effective sports training, since it cannot be based only on qualitative evaluation of performance, must rely upon quantitative information, which is available today using expensive isokinetic machines or other electromagnetic dynamometers. This large equipment can only be afforded by elite sports centers and specialized clinics around the world, leaving behind the smaller units and most sports facilities. We have shown in the present paper that **DINABANG®** can readily assess asymmetry by measuring both lower limbs during the simple and standardized motor task described here.

## CONCLUSIÓN

A new instrument to determine force asymmetry was presented, **DINABANG®**, which shows results in real time, during a specific motor task such as extending the hip while the knee is extended. We present here a set of standardized results in a population of healthy athletes. **DINABANG®** is available for the medical office, the laboratory or the sports field, as part of a Technology Transfer to MOVI company.

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