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COMPARISON OF BONE METABOLISM MARKERS (BAP and TRACP-5b) ELITE VERSUS NON-ELITE IN COLLEGIATE MALE LONG-DISTANCE RUNNERS

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INTRODUCTION:

The effect of exercise on bone health has received much attention in recent years. Overuse injuries, including stress fractures, are serious problems faced by athletes. Track-and-field athletes have the highest incidence of stress fractures than the other athletes (1). A stress fracture is a break in bone tissue caused by repeated minor external mechanical stress caused by activities, such as running, that can occasionally lead to a complete fracture. Stress fracture is a serious injury because it takes a long time for complete healing and prevents athletes from training (2). Bone strength is associated with bone density and quality (bone metabolism and collagen cross-linking). Low bone density has been reported to increase the risk of stress fracture. Nonetheless, as results based on bone density reflect nutritional condition and mechanical stress over several previous months, they are not suitable for early detection of stress fractures. This study aimed to examine the usability of some bone metabolism markers to prevent overuse bone injuries in collegiate male long-distance runners.

METHODS:

The subjects included 18 elite collegiate male long-distance runners ([ER] height, 172.6 ± 5.5 cm; weight, 57.4 ± 4.9 kg; body fat percentage, $6.0\% \pm 2.0\%$) and 9 non-elite collegiate male long-distance runners ([NER] height, 169.0 ± 4.4 cm; weight, 57.4 ± 7.1 kg; body fat percentage, $11.5\% \pm 2.6\%$). Bone metabolism markers, such as bone alkaline phosphatase (BAP) and bone-specific tartrate-resistant acid phosphatase (TRACP-5b), were measured in both the groups. Body fat percentage was measured by bioimpedance analysis.

RESULTS:

No significant differences were observed in the levels of BAP (ER 16.4 ± 3.9 vs. NER 15.5 ± 6.5 U/L) and TRACP-5b (ER 574.3 ± 162.6 vs. NER 656.4 ± 195.7 mU/dL) between the elite and non-elite collegiate male long-distance runners. However, the body fat percentage was significantly different between ER ($6.0\% \pm 2.0\%$) and NER ($11.5\% \pm 2.6\%$) ($p < 0.001$).

CONCLUSION:

In this study, targeting 18 elite and 9 non-elite collegiate male long-distance runners, we conducted a questionnaire survey on physical characteristics and measured bone metabolism marker with the serum samples. The finding is as follows: In non-elite collegiate male long-distance runners, body fat percentage was significantly higher than that in the elite collegiate male long-distance runners ($p < 0.001$).

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