
The impact of osteopathic treatment on the lower limb motor performance of elite handball players

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Résumé

OBJECTIVE:

The objective of this investigation was to assess the impact of osteopathic treatment on lower limb motor performance of high-level handballers. This study focused on three key parameters of athletic performance: flexibility, jump height, and repeated sprint ability. These components directly influence optimal performance on the court.

MATERIALS AND METHODS:

The study was conducted from January 9 to May 14, 2025 and involved 30 semi-professional and professional male handballers. These players were randomly divided into two groups: a control group (CG) and an experimental group (EG). The EG (Age: 22 ± 3.9 years; Height: 183.7 ± 6.7 cm; Mass: 84.9 ± 11.2 Kg) received a full osteopathic treatment session, while CG (Age: 24.6 ± 2.8 years; Height: 184.1 ± 8.1 cm; Mass: 86.2 ± 18 Kg) received a placebo treatment. Prior to and following the treatment, both groups underwent a series of tests to measure their flexibility, vertical jump height, and repeated sprint ability. Directly after the pre-treatment measurements, EG received an osteopathic diagnosis followed by a personalized osteopathic treatment lasting an average of 30 minutes. The osteopathic diagnosis consists of a static and then dynamic observation after eliminating any potential diagnoses of exclusion. The proposed osteopathic treatments include structural techniques, based on high-velocity and low-amplitude (HVLA) manipulations as well as myotensive techniques to restore joint mobility. Myofascial techniques aim to work on soft tissues using muscle pumping techniques, strain-counter-strain, and trigger points treatment. The CG received an osteopathic assessment and then simple hand-positioning without the intention of treatment (passive and non-specific mobilization of certain joints). The players were not aware of the treatment received (placebo or real treatment). Joint ranges of motion were assessed (using a goniometer) at the lower limb, including the right and left: hip (flexion, extension and abduction), rectus femoris and hamstrings extensibility and ankle dorsiflexion. A standardized Counter Movement Jump (CMJ, App MyJumpLab) test was used to measure vertical jump height (CMJmean of 3 best jumps on 5 realized and CMJpic). Also, repeated sprint ability (RSA) was evaluated using the 30-15 Intermittent Fitness Test, which measures a player's ability to perform repeated sprints with short recovery intervals.

RESULTS:

*Intervenant

In terms of jump height, the Student t test showed a non significant difference ($p > 0.05$) between GT and GE before treatment for CMJmean (38.31 ± 6.13 cm and 38.59 ± 4.61 cm, respectively) neither than CMJpic (39.49 ± 6.10 cm and 39.95 ± 4.75 cm). However, the test shows significant differences ($p < 0.001$) between GT and GE after treatment for both CMJmean (38.91 ± 6.51 cm and 41.71 ± 5.72 cm) and CMJpic (40.00 ± 6.24 and 42.78 ± 6.11).

In terms of right hip flexion (RHF) flexibility, the two-way ANOVA test for repeated measures (groups: GT/GE x session: PRE/POST) show no group nor interaction effects ($p > 0.05$) but a session effect ($p = 0.025$). The Bonferroni post-hoc test show a significantly higher RHF flexibility in POST than in PRE treatment for GE group ($p = 0.036$). In terms of left hip flexion (LHF) flexibility, the ANOVA test for repeated measures (groups: GT/GE x session: PRE/POST) show no group effect ($p > 0.05$) but a session ($p = 0.004$) and an interaction ($p = 0.038$) effects. The Bonferroni post-hoc test show a significantly higher LHF flexibility in POST than in PRE treatment for GE group ($p = 0.037$). Almost same results were encountered for other flexibility tests (Right hip abduction, right hamstrings extensibility, right and left ankle dorsiflexion), excepted for left hip abduction, left hamstrings extensibility, left and right rectus femoris extensibility where no significant differences were found.

In terms of RSA test, the two-way ANOVA test for repeated measures (Groups x Sessions) show a group and a session effects ($p=0.024$ and $p=0.015$) but no interaction effect ($p=0.72$). The post-hoc Bonferroni test revealed a significant higher value for GE Post than for GT Pre (21.06 ± 1.37 km/h and 19.26 ± 1.60 km/h; $p = 0.007$).

CONCLUSIONS:

These findings suggest that osteopathic treatment may have an effect on the improvement of flexibility, power, and repeated sprint ability. These considerable gains could be attributed to osteopathy's potential to optimize musculoskeletal function, enhance mobility, and reduce muscle stiffness, which in turn may help athletes during high-intensity sports activities. However, further research is needed to explore the long-term effects of osteopathic treatment in sports performance. Further investigations are recommended to substantiate these initial findings.

KEYWORDS: Osteopathy, motor performance, handball.