World Academy of Science, Engineering and Technology
International Journal of Sport and Health Sciences
Vol:17, No:08, 2023

Methylphenidate and Placebo Effect on Brain Activity and Basketball Free Throw: A Randomized Controlled Trial

Authors : Mohammad Khazaei, Reza Rostami, Hasan Gharayagh Zandi, Rouhollah Basatnia, Mahbubeh Ghayour Najafabadi

Abstract : Objective: Methylphenidate has been demonstrated to enhance attention and cognitive processes, and placebo treatments have also been found to improve attention and cognitive processes. Additionally, methylphenidate may have positive effects on motion perception and sports performance. Nevertheless, additional research is needed to fully comprehend the neural mechanisms underlying the effects of methylphenidate and placebo on cognitive and motor functions. Methods: In this randomized controlled trial, 18 young semi-professional basketball players aged 18-23 years were randomly and equally assigned to either a Ritalin or Placebo group. The participants performed 20 consecutive free throws; their scores were recorded on a 0-3 scale. The participants' brain activity was recorded using electroencephalography (EEG) for 5 minutes seated with their eyes closed. The Ritalin group received a 10 mg dose of methylphenidate, while the Placebo group received a 10mg dose of placebo. The EEG was obtained 90 minutes after the drug was administere Results: There was no significant difference in the absolute power of brain waves between the pre-test and post-tests in the Placebo group. However, in the Ritalin group, a significant difference in the absolute power of brain waves was observed in the Theta band (5-6 Hz) and Beta band (21-30 Hz) between pre- and post-tests in Fp2, F8, and Fp1. In these areas, the absolute power of Beta waves was higher during the post-test than during the pre-test. The Placebo group showed a more significant difference in free throw scores than the Ritalin group. Conclusions: In conclusion, these results suggest that Ritalin effect on brain activity in areas associated with attention and cognitive processes, as well as improve basketball free throws. However, there was no significant placebo effect on brain activity performance, but it significantly affected the improvement of free throws. Further research is needed to fully understand the effects of methylphenidate and placebo on cognitive and motor functions.

Keywords : methylphenidate, placebo effect, electroencephalography, basketball free throw
Conference Title : ICSEP 2023 : International Conference on Sport and Exercise Psychology
Conference Location : Vancouver, Canada
Conference Dates : August 03-04, 2023