

INPLASY2023110085

doi: 10.37766/inplasy2023.11.0085

Received: 22 November 2023

Published: 22 November 2023

Corresponding author:

Shuzhen Ma

msz20210607@126.com

Author Affiliation:

Universiti Putra Malaysia.

Ma, SZ¹; Soh, KG².

ADMINISTRATIVE INFORMATION

Support - No.

Review Stage at time of this submission - Data analysis.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY2023110085

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 22 November 2023 and was last updated on 22 November 2023.

INTRODUCTION

Review question / Objective It has been documented that core strength training (CST) can improve performance in some sports. Although CST is one of the most commonly used strength training methods in badminton training, there is no relevant research on the thorough analysis of the performance of badminton players with CST.

Rationale The aim of this study was to synthesize the evidence on the effect of core strength training on badminton players' performance to determine the effect of core training on badminton players. This study followed PRISMA guidelines and was systematically searched in Scopus, Web of Science, Sports discussion and PubMed databases with a deadline of August 2023.

Condition being studied It has been documented that core strength training (CST) can improve performance in some sports. Although CST is one of the most commonly used strength training methods in badminton training, there is no relevant research on the thorough analysis of the performance of badminton players with CST.

METHODS

Search strategy This study uses well-known databases to search for relevant literatures. The databases used to search literature before September 2023 include: SCOUPS, Pubmed, CNKI, Web of science, and EBCO host. The keywords of this search are "Core strength training" OR "Core training" OR "Core-muscle training" OR "Core exercise" OR "Core-stability exercise" and "Badminton athletes" OR

“badminton players” OR “badminton beginners” OR “shuttler”.

Participant or population Thirteen moderate-quality studies involved 208 athletes aged 10-19 years with inclusion criteria. The Sample size ranged from 8 to 34, and the CST intervention lasted for 4 to 16 weeks, including 1 to 4 exercises per week and 20min-120min training time per session. The 13 articles consisted of 208 subjects with mean value of 16. The sample size ranged from 8 to 28 participants. 6 articles focused on males (Deng, 2015; Sun & Shao, 2023; Tang, 2020; Xu, 2012; Zhao, Yuqing, & Juan, 2017; Zhou, chen, & yan, 2015), 4 articles focused on females combine males (Hu, 2021; Khatoon & Thiyagarajan, 2021; Yüksel & Akin, 2017; Zhang, Yao, CAO, Ren, & Chen, 2023) and the remaining 3 articles did not specialize gender (Li & Guo, 2018; liu, 2017; T. Ozmen & M. Aydogmus, 2016), 0 articles focused on females. 10 articles had participants at the school level (Deng, 2015; Hu, 2021; Khatoon & Thiyagarajan, 2021; Li & Guo, 2018; liu, 2017; Sun & Shao, 2023; Tang, 2020; Xu, 2012; Zhao et al., 2017; Zhou et al., 2015), 1 at the beginner level (T. Ozmen & M. Aydogmus, 2016), 1 at the provincial level (Zhang et al., 2023), 1 at the national level (Deng, 2015). The participants had an age range from 10 to 29 years old in all articles. The age group of the review articles focused on 18-22 year (Deng, 2015; liu, 2017; Tang, 2020; Yüksel & Akin, 2017; Zhou et al., 2015), with 1 articles showing no age (Khatoon & Thiyagarajan, 2021). The height of subjects in the review articles was concentrated in the male group of 1.72-1.80m, the female group of 1.68-1.70m, the weight of the male group of 57.58-75kg, and the height of the female group of 49.82-50.75kg. The BMI of the review articles was concentrated in the range of 18.3-23.2 for men and 17.5-17.6 for women. There were 2 articles that did not include BMI or did not know gender (Khatoon & Thiyagarajan, 2021; Yüksel & Akin, 2017).

Intervention Mainly from the intervention method, intervention period, intervention frequency, intervention time, and whether the experiment is randomized. For the comparative methods, there were 12 articles reported that the core strength training mainly adopted the dynamic and static combined with core strength training (CCST) (Deng, 2015; Hu, 2021; Khatoon & Thiyagarajan, 2021; Li & Guo, 2018; liu, 2017; T. Ozmen & M. Aydogmus, 2016; Sun & Shao, 2023; Tang, 2020; Xu, 2012; Yüksel & Akin, 2017; Zhao et al., 2017; Zhou et al., 2015), and one study compared dynamic core strength to static core strength (Zhang et al., 2023). In order to highlight the training effect, 4 of these 13 articles are compared

with the non-training (NT) group (Hu, 2021; T. Ozmen & M. Aydogmus, 2016; Sun & Shao, 2023; Yüksel & Akin, 2017), 7 are compared with the traditional strength training (TST) group (Deng, 2015; Li & Guo, 2018; liu, 2017; Tang, 2020; Xu, 2012; Zhao et al., 2017; Zhou et al., 2015), and only 1 is compared with the plyometric training (PT) group (Yüksel & Akin, 2017) and dynamic core strength (DCS) is compared with static core strength (SCS) (Zhang et al., 2023). In 13 articles, all the researchers.

Comparator Core strength training versus other exercises.

Study designs to be included Randomized controlled trial.

Eligibility criteria Criteria were used PICOS, including population, intervention, comparison, outcome and study designs (see Table1). This study mainly focuses on the impact of core strength training on the performance of young badminton players. If the literature meets the following criteria, it will be included in the study.1) Literature can be searched in full text.2) Conduct core strength training experiment for more than 4 weeks.3) CST intervention to an active control group.4) including a complete core strength training method. 5) randomized control designs.

Information sources This study uses well-known databases to search for relevant literatures. The databases used to search literature before September 2023 include: SCOPUS, Pubmed, CNKI, Web of science, and EBCO host. The keywords of this search are “Core strength training” OR “Core training” OR “Core-muscle training” OR “Core exercise” OR “Core-stability exercise” and “Badminton athletes” OR “badminton players” OR “badminton beginners” OR “shuttler”.

Two independent reviewers evaluate the title and abstract of the paper, select and include articles that meet the predetermined inclusion criteria, and exclude research papers that do not. The selected papers will be read in full, and in this process, the articles that cannot be filtered to the full text will be deleted. If there is a difference of opinion during this process, a third reviewer will be consulted for advice until an agreement can be reached.

Main outcome(s) Thirteen moderate-quality studies involved 208 athletes aged 10-19 years with inclusion criteria. The Sample size ranged from 8 to 34, and the CST intervention lasted for 4 to 16 weeks, including 1 to 4 exercises per week and 20min-120min training time per session. It is

found that the core strength training has a positive effect on the stability and balance of badminton players, the on situ mid-court skill sand the moving position hitting skill. This was proved by meta-analysis, Core strength training for explosive power (standing long jump, n=4) has an effect on the performance of badminton (mean SMDb = 0.03, I2 = 0%, Chi2 = 0.14, df =2, p = 0.04). Effect of Core Strength Training on Situ Skill, Core strength training for front-court skill (net lift skill, n=3) had a significant effect (SMDb = 2.53, I2 = 0%, Chi2 = 1.88, df =2, p = 0.003). It has significant effect on the performance of badminton back-court skill (Hight clear skill, n=3) (SMDb = 2.33, I2 = 0%, Chi2 = 1.47, df =2, p = 0.002). Funnel plots in all three analyses showed no bias in the results of meta-analysis.

Additional outcome(s) Not.

Data management There are no studies on the coordination and body composition of badminton players.

Quality assessment / Risk of bias analysis The risk of bias (RoB) assessment was performed using the Cochrane RoB tool (Higgins & Altman, 2008). This tool assesses the RoB according to the following seven domains: random sequence generation, allocation concealment, blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, selective reporting, and other sources of bias (Fig. 2) (Rodríguez-Perea et al., 2023). Each domain could be considered as “low,” “unclear,” or “high”, All procedures are performed by two testers, and when two testers disagree, a third tester is consulted.

Strategy of data synthesis Authors should describe how the data will be analysed. Methodological quality was assessed using Cochrane collaborative bias risk tools and recommendations for graded assessment, Certainty or confidence in the body of evidence was assessed using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE).

Subgroup analysis No.

Sensitivity analysis Funnel plots in all three analyses showed no bias in the results of meta-analysis.

Language restriction English and Chinese.

Country(ies) involved China.

Other relevant information No.

Keywords Core Strength Training, Badminton Player, Performance.

Contributions of each author

Author 1 - Shuzhen Ma.

Email: msz20210607@126.com

Author 2 - Kim Geok Soh.