INPLASY

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THE INFLUENCE OF ANTHROPOMETRIC CHARACTERISTICS ON THE TECHNICAL PROFILE OF OLYMPIC BOXING ATHLETES: A SYSTEMATIC REVIEW

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ADMINISTRATIVE INFORMATION

INTRODUCTION

*R*eview question / Objective Given that the review is systematic, the PICOS framework can be refined to reflect this:

P (Population): Olympic boxing athletes, both male and female, from existing observational studies.

I (Intervention): Examination of the influence of anthropometric characteristics (e.g., height, body mass, and other body measurements) on the technical aspects of boxing, particularly the choice and effectiveness of different punches.

C (Comparison): Comparison of athletes with different anthropometric characteristics (e.g., taller vs. shorter, heavier vs. lighter) to determine their influence on punch selection (e.g., direct punches vs. hooks) and execution.

O (Outcome): To determine how anthropometric variables (e.g., height, body mass) affect the technical profile of punches (such as frequency and effectiveness of specific punches like direct punches or hooks).

S (Study Design): Systematic review of observational studies that assess the relationship between anthropometric characteristics and boxing technique, using validated and standardized observation tools.

This systematic review aims to synthesize evidence from observational studies to assess the role of anthropometric traits in the technical profile of boxing punches, identifying patterns and gaps in the current literature, and determining the need for more rigorous methodologies in this area.

Rationale The rationale for the study stems from the recognition that anthropometric characteristics, such as height and body mass, may influence the technical profile of boxing, particularly in the selection and effectiveness of different punches (e.g., direct punches and hooks). Despite this assumption, the existing literature provides mixed results, with some studies failing to establish clear links between body measurements and technical strategies in Olympic boxing. Additionally, a lack of standardized and validated observation tools

complicates the ability to draw consistent conclusions.

This study seeks to address these gaps by conducting a systematic review to analyze the available evidence on how anthropometric traits affect boxing technique. By doing so, the review aims to provide a clearer understanding of the relationship between body measurements and punch selection, potentially guiding coaching strategies, training plans, and competition preparation for athletes of different body types. Furthermore, the study underscores the need for rigorous, validated methodologies to better assess technical performance in boxing, which can ultimately improve the quality of future research and advance the sport.

Condition being studied The condition being studied is the technical profile of punches in Olympic boxing, specifically how anthropometric characteristics (such as height, body mass, and possibly other body measurements) influence the choice and effectiveness of different punches (e.g., direct punches and hooks) in boxers. This includes understanding how these physical characteristics may affect athletes' punching strategies, power, and overall boxing performance. The study aims to explore the connection between the boxer's body measurements and the punches they execute during competition.

METHODS

Search strategy The search strategy for the study involved conducting a literature search in two databases: PubMed and SPORTDiscus. The process can be broken down into the following steps:
1. Initial Search: A broad search was conducted in PubMed and SPORTDiscus, which resulted in 203 potentially relevant studies. An additional study was manually added, increasing the total to 204.
2. Exclusion Based on Title and Abstract: Out of the 204 studies, 4 were duplicates and removed. A further 181 studies were excluded after reviewing their titles and abstracts, mainly because they did not address anthropometric characteristics or relevant results related to punch techniques. Qualitative studies, systematic reviews, and meta-analyses were also excluded at this stage.
3. Full-Text Review: The remaining 19 studies were read in full. After this stage, 6 studies were selected for inclusion in the final review based on meeting the inclusion criteria.

This search strategy ensured that only studies focusing on the relationship between anthropometric characteristics and punching techniques in boxing were included in the systematic review.

Participant or population The population in this review consisted of boxers who participated in Olympic boxing competitions. The review focused on studies that analyzed the relationship between the athletes' anthropometric characteristics (such as height, body mass, etc.) and their punching techniques in boxing. However, the specific characteristics of the populations varied across the studies included in the review, with a mix of male and female athletes. Not all studies provided detailed information on the exact characteristics of the participants, and some studies involved homogeneous samples in terms of height or weight, which affected the ability to analyze the impact of anthropometric variables on punching techniques effectively.

Intervention In the context of this systematic review, there was no specific intervention. Instead, the review focused on analyzing the relationship between anthropometric characteristics (such as height, body mass, etc.) and punching techniques (e.g., types of punches, frequency, and effectiveness) in Olympic boxers. The aim was to understand how these factors might influence the technical profile of boxers during competitions. Therefore, the "intervention" in this case refers more to the variables being studied (anthropometric characteristics) rather than a specific treatment or action applied to participants.

Comparator The review will likely compare boxers based on factors like:
1. Height: Comparing how boxers of varying heights use different types of punches, particularly direct punches and hooks.
2. Body Mass: Comparing the effect of body mass on punch effectiveness and preferred punching techniques.
3. Punching Techniques: Comparing how the frequency and types of punches vary between boxers with different anthropometric profiles.
Thus, the comparative analysis involves observing the technical differences based on the anthropometric features of boxers within the population of Olympic-level athletes. The aim is to identify any potential patterns in punch selection and execution based on these characteristics.

Study designs to be included All study designs were considered for inclusion in this review, except for qualitative studies, systematic reviews, and meta-analyses.

Eligibility criteria All studies published to date that reported participants' anthropometric characteristics (e.g., height and body mass) in relation to the analysis of the technical profile of Olympic boxing were included. This review was limited to articles published in English.

Information sources The literature search was conducted in the PubMed and SPORTDiscus databases.

Main outcome(s) The main outcomes of this systematic review focus on the relationship between athletes' anthropometric characteristics (e.g., height and body mass) and their technical profiles in Olympic boxing, specifically the types of punches performed (e.g., Straight punches, Lead Hooks).
The studies included were published up to July 2024, with a cross-sectional approach to analyzing punch patterns, with no long-term follow-up.
Effect measures include the frequency and types of punches used by athletes, and any patterns of punch selection linked to anthropometric traits such as height and body mass. Additionally, the validity of observational tools used in the studies is also assessed to ensure accurate and reliable results.

Quality assessment / Risk of bias analysis To assess the quality of the included studies, an adapted version of the Quality Assessment Tool for Quantitative Studies developed by the Effective Public Health Practice Project (Thomas et al., 2004) was utilized. This tool is recommended by the Cochrane Public Health Review Group (Higgins et al., 2011) and has been previously applied by Teixeira et al. (2015). It evaluates the quality of experimental and observational studies across eight domains: representativeness (selection bias), study design, confounding factors, blinding, data collection, data analysis, result presentation, and representativeness (exclusions/dropouts). Each domain is rated as strong (good methodological quality), moderate, or weak (low methodological quality), with the overall quality determined based on the ratings of each domain.

Strategy of data synthesis For data extraction, a specific form was developed to gather the following information: i. Study details (authors and year of publication); ii. Study design; iii. Participants (sample size, gender, age, height, and body mass); iv. Variables of interest (types of punches analyzed); v. Measurement instruments; vi. Main results (total punch averages and most frequently used punches). A qualitative synthesis of the data was presented in table format. The characteristics and variables extracted were organized by study in alphabetical order.

Subgroup analysis The subgroup analysis in this study focused on evaluating the influence of anthropometric characteristics (e.g., height, arm span, body mass, and BMI) on the technical attack profile (e.g., punch type, target, outcome, and combinations) and competition outcomes in Olympic boxing. The subgroups were primarily defined by anthropometric traits (e.g., shorter athletes with smaller arm spans versus taller athletes with greater arm spans) and their corresponding technical and performance profiles.

Sensitivity analysis In this systematic review, sensitivity analysis will be conducted to test the robustness of the results and the impact of methodological decisions. The following steps will be undertaken:
1. Exclusion of Low-Quality Studies: Reanalyze the results after excluding studies rated as having weak methodological quality according to the Quality Assessment Tool for Quantitative Studies.
2. Language Restriction: Assess the potential impact of limiting the review to English-language articles by identifying any non-English studies missed during the initial search.
3. Study Design Sensitivity: Reanalyze the data by excluding specific study designs (e.g., cross-sectional studies) to evaluate their influence on the findings.
4. Subgroup Analysis: Conduct subgroup analyses by participant characteristics (e.g., gender, age, or competition level) to determine whether results differ across groups.

Country(ies) involved Portugal.

Keywords Olympic Boxing; Anthropometric characteristics; Technical profile.

Contributions of each author
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