

INPLASY

Strength parameters that influence sport performance in women's track cycling: a systematized review

INPLASY202550092

doi: 10.37766/inplasy2025.5.0092

Received: 29 May 2025

Published: 29 May 2025

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ADMINISTRATIVE INFORMATION

Support - There is no financial support.

Review Stage at time of this submission - Preliminary searches.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202550092

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 29 May 2025 and was last updated on 29 May 2025.

INTRODUCTION

Review question / Objective Question: What strength parameters influence sport performance in women's track cycling?

General objective: Describe parameters and valuations of strength made on female track cyclist.

Specific Objective: Analyze the different variables of strength related to female track cycling.

Rationale When reviewing the literature on cycling, the vast majority of articles focus on road cycling. Furthermore, the main variables studied are power and critical power. Most of these studies do not focus on women, or their results are not disaggregated by gender. Additionally, when searching for information on kinetic variables in female track cyclists in Spanish-speaking databases, no relevant results are found.

Condition being studied Sport performance in female track cycling.

METHODS

Search strategy We carried out a search in the databases: Pubmed, Scopus, Web of Science, Dialnet and Scielo, considering publication dates between the 1 of January of 2016 and the 26 of May of 2025 and the search was filtered by the languages Spanish and English. The combination between keywords were filtered by title and abstract in the databases Scopus, Pubmed and Web of Science, while in the databases Scielo and Dialnet the keywords were searched in all fields. The keywords were ciclismo, mujer, fuerza, rendimiento atlético, potencia, biomecánica, evaluación, prueba física, ciclismo pista, cinética, strength, power, Athletic performance, muscle strength, track cycling, cycling, women, feminine, test, evaluation, physical test, kinetics y biomechanics. With the key words and the Boolean connectors [AND] and [OR] we search the following prompts in the database Scielo: "ciclismo AND mujer", "ciclismo AND fuerza", "ciclismo AND rendimiento atlético", "ciclismo AND potencia", "ciclismo AND biomecánica", "ciclismo AND

evaluación”, “ciclismo AND prueba física”, “ciclismo AND cinética” and “ciclismo pista”, in the case of Dialnet we use the same prompts stated before but without Boolean connectors due to the web interface limitations and finally in the case of Scopus, Pub Med and Scielo we use the following prompts ((Strength) OR (Muscle strength)) AND (Athletic performance) AND ((Cycling) OR (Track cycling)) AND ((Women) OR (Female)), ((Strength) OR (Muscle strength)) AND ((Cycling) OR (Track cycling)) AND ((Women) OR (Female)) AND ((Biomechanics) OR (Kinetics)), ((Strength) OR (Muscle strength)) AND ((Cycling) OR (Track cycling)) AND ((Women) OR (Female)), ((Strength) OR (Muscle strength)) AND ((Cycling) OR (Track cycling)) AND ((Women) OR (Female)) AND ((Test) OR (evaluation) OR (physical test)), (Power) AND (Athletic performance) AND ((Cycling) OR (Track cycling)) AND ((Women) OR (Female)), (Power) AND ((Cycling) OR (Track cycling)) AND ((Women) OR (Female)) AND ((Biomechanics) OR (Kinetics)), (Power) AND ((Cycling) OR (Track cycling)) AND ((Women) OR (Female)), (Power) AND ((Cycling) OR (Track cycling)) AND ((women) OR (Female)) AND ((evaluation) OR (test) OR (physical test)), ((Cycling) OR (track cycling)) AND ((biomechanics) OR (kinetics)) AND ((women) OR (Female)), ((Cycling) OR (track cycling)) AND ((women) OR (Female)) AND ((evaluation) OR (test) OR (physical test)), (Athletic performance) AND ((Cycling) OR (track cycling)) AND ((women) OR (Female)), (Athletic performance) AND ((Cycling) OR (track cycling)) AND ((women) OR (Female)) AND ((evaluation) OR (test) OR (physical test)). Finally a snowball search will be made in the bibliography of each selected article.

Participant or population Women track cyclist.

Intervention We will accept all kinds of interventions related to kinetic variables in feminine track cycling that test these variables.

Comparator We will compare the different methodologies of obtention of strength variables and the variables themselves according to each objective stated by their investigation.

Study designs to be included First order studies.

Eligibility criteria Population: (i) Only studies containing female subjects will be included. (ii) Studies where the subjects present some kind of disability included in the paralympic classification established by the international paralympic committee will be excluded.

Intervention: (i) Studies that carry evaluations of kinetics variables relative to track cycling will be included (ii) Only first order studies will be included.

Results: (i) Studies whose results are related to strength variables will be included. (ii) Studies whose results are mixed but with no difference between genders will be excluded.

Information sources Scopus, Web of Science, Pub Med, Dialnet and Scielo.

Main outcome(s) We expect to compile kinetic variables related to feminine track cycling, also we will compile and compare if there is more than one method of obtention of that variable and finally we will take the values of these variables for future analysis.

Additional outcome(s) Additional outcomes we may find are variables of context like muscle mass or anatomy of the subjects, these variables can help contextualize better the hole picture of the investigation.

Data management All papers will be collected using the software RefWorks. Duplicate records will first be removed within RefWorks, and then further checked and eliminated using Excel. Subsequently, the papers will be screened in Excel based on predefined eligibility criteria. The screening process will be conducted by two independent researchers, and in case of discrepancies, a third researcher will be consulted to reach a consensus.

Quality assessment / Risk of bias analysis We used the Downs and Black quality assessment scale because it has greater applicability to various types of studies (randomized and non-randomized) and also offers a higher level of reliability and validity compared to other scales.

Strategy of data synthesis The strategy will be synthesized into three categories: two qualitative and one quantitative. The first qualitative category will refer to the method of data collection, the second will analyze the variables themselves, and the third category will be quantitative, related to the actual values of the variables.

Subgroup analysis The subgroup we will analyze will be the female track cyclist in all the articles reviewed.

Sensitivity analysis We will use the Downs and Black scale to assess the validity of the variables,

as the scale includes items that evaluate bias in the measurement of both the intervention and the outcomes.

Language restriction We searched only studies published in Spanish and in English.

Country(ies) involved Chile and Spain.

Other relevant information We use the following articles to determine the rationale:

-Salas Montoro, José Antonio. Apnea: una alternativa a la hipoxia para mejorar el rendimiento en ciclismo. Granada: Universidad de Granada, 2023. [<https://hdl.handle.net/10481/84687>]

-González Sánchez, J. (2020). Análisis y determinación del tiempo límite y de la potencia generada en el segundo umbral ventilatorio y en el $\dot{V}O_2\text{max}$ en ciclistas con diferentes niveles de condición física.

-Susan Armijo Olivo, Luciana Gazzi Macedo, Inae Caroline Gadotti, Jorge Fuentes, Tasha Stanton, David J Magee, Scales to Assess the Quality of Randomized Controlled Trials: A Systematic Review, *Physical Therapy*, Volume 88, Issue 2, 1 February 2008, Pages 156–175, <https://doi.org/10.2522/ptj.20070147>

And the Downs and Black scale:

-Downs SH, Black N. The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. *J Epidemiol Community Health*. 1998 Jun;52(6):377-84. doi: 10.1136/jech.52.6.377. PMID: 9764259; PMCID: PMC1756728.

Keywords Cycling, women, strength, athletic performance, power, biomechanics, test, evaluation, physical test, track cycling, kinetics, muscle strength and feminine.

Dissemination plans After the development of the review the plan is to publish it in some journal for further dissemination.

Contributions of each author

Author 1 - Freddy Paniagua Molina - Author 1 contributed with the review of literature, evaluating the quality of studies, extracting data from these studies analyzing it and finally making the discussion and results.

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Author 2 - Bastián Salazar Adasme - Author 2 contributed with the review of literature, evaluating the quality of studies, extracting data from these studies analyzing it and finally making the discussion and results.

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