Motor profile of male special forces operators: a systematic review

Perfil motor de los operadores de fuerzas especiales masculinos: una revisión sistemática

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Abstract

Purpose: Special Forces units are responsible for performing the most demanding and risky operations. They are mainly characterized by elite operators, a high level of physical preparation, commitment, creativity, adaptation to changing combat conditions, and a greater range of skills. This systematic review aims to provide an overview of current knowledge about the motor skills of male special forces operators worldwide and to identify the methods used to assess them.
Methods: Electronic searches were conducted in Scopus, PubMed, and Web of Science databases. Of the 8 632 studies identified, 38 met the inclusion criteria.
Results: The review showed that aerobic and anaerobic endurance, strength, and power are the most frequently analyzed motor abilities. Among the less frequently analyzed motor abilities, we can include agility, speed, flexibility, and balance.
Conclusions: The results of this review indicate that testing methodology should be standardized so that motor profiles can be compared between different special forces units and even between other populations. Additionally, creating a motor profile and administering a single battery of tests can help select, train, and accelerate the return to full fitness of special forces operators after injury.

Keywords

Military; soldiers; special operations forces; fitness profile; physical fitness.

Resumen

Propósito: Las unidades de Fuerzas Especiales son responsables de llevar a cabo las operaciones más exigentes y arriesgadas. Se caracterizan principalmente por contar con operadores de élite, un alto nivel de preparación física, compromiso, creatividad, adaptación a las condiciones cambiantes del combate y una mayor gama de habilidades. Esta revisión sistemática tiene como objetivo proporcionar una visión general del conocimiento actual sobre las capacidades motoras de los operadores masculinos de fuerzas especiales en todo el mundo e identificar los métodos utilizados para evaluarlas.
Métodos: Se realizaron búsquedas electrónicas en las bases de datos Scopus, PubMed y Web of Science. De los 8 632 estudios identificados, 38 cumplieron con los criterios de inclusión. Resultados: La revisión mostró que la resistencia aeróbica y anaeróbica, la fuerza y la potencia son las capacidades motoras analizadas con mayor frecuencia. Entre las capacidades motoras analizadas con menor frecuencia, podemos incluir la agilidad, la velocidad, la flexibilidad y el equilibrio.
Conclusiones: Los resultados de esta revisión indican que la metodología de evaluación debería estandarizarse para que los perfiles motores puedan ser comparados entre diferentes unidades de fuerzas especiales e incluso entre otras poblaciones. Además, la creación de un perfil motor y la aplicación de una única batería de pruebas pueden ayudar a la selección, el entrenamiento y a acelerar el retorno a la plena capacidad física de los operadores de fuerzas especiales después de una lesión.

Palabras clave

Militares; soldados; fuerzas de operaciones especiales; perfil de condición física; condición física.

Introduction

Despite the ongoing development of military armaments, the physical fitness requirements of soldiers are constantly increasing (Carlson and Jaenen, 2012). In addition, Jones et al. (2017) indicate that inadequate physical preparation may be a significant factor in injury occurrence that prevents combat preparedness. Moreover, Heebner et al. (2017) observed that more than 20% of U.S. special forces operators per year get injured, and that could have been avoided with proper identification. It is also important to note that increased body fat levels may result in lower fitness levels, while higher body fat levels may improve some motor skills (Dawes et al. 2016).

While many studies confirm the importance of physical fitness in soldiers, Finnish soldiers' aerobic capacity and muscle strength levels have deteriorated over the years (Santtila et al. 2018). On the other hand, a study of Latvian officers found that up to 22.7% of respondents had low physical activity levels (Plavina 2011). Therefore, continuous observation of soldiers' physical fitness is necessary to maintain ongoing readiness and combat preparedness (Colmenero et al. 2014; Różański et al. 2020).

The most elite military groups are special forces operators characterized by specific skills, versatility, and efficiency. Their tasks include the most responsible and risky special operations (NATO, 2012). Special operations are associated with prolonged marches with heavy loads, short bursts of high-intensity exercise, or climbing with loads (Carlson and Jaenen, 2012). Studies show that special forces operators have higher physical preparation and energy requirements than regular military personnel (Maupin et al. 2018). Special forces operators' responsibility and physical requirements are very high, so to become part of a special forces unit, a candidate must complete a selection and a series of training courses (Hunt et al. 2013). The selection and training process varies worldwide, while caloric deficits, sleep deprivation, and prolonged weight-bearing marches characterize all (Hunt et al. 2013; Carlson and Jaenen, 2012). One of the most common reasons for dropping out of the selection process cited by candidates is inadequate physical preparation (Farina et al. 2019).

Many studies determine special forces operator' physical fitness level, defining the level of only one or a few motor abilities. In addition, the measurement methods used in the study are different (Maupin et al. 2018; Colmenero et al. 2014; Cialdella-Kam et al. 2023). Colmenero et al. (2014) focused on analyzing methods for assessing physical fitness in the military population. It was found that cardiovascular fitness in the military was measured by forty-six different methods, skeletal muscle fitness by eighty different tests, seven different agility tests, seven different speed tests, three different coordination tests, and three different balance tests (Colmenero et al. 2014). The review focused only on methods, not on the level of motor skills in the uniformed services. In addition, the review was conducted for the entire uniformed services population. Maupin et al. (2018) performed a literature review on the motor profile of elite tactical units. However, this review considered all special units that are part of the military, police, or fire brigade. Another literature review focuses on the relationship between body composition and physical fitness (Cialdella-Kam et al. 2023). The authors point out that a limitation of the study is that the inclusion criteria need to be more specific, and the groups are heterogeneous. In addition, the review also includes all military personnel and considers both men and women (Cialdella-Kam et al. 2023).

Many studies determine the level of physical fitness of special forces operators while often determining the level of only one or a few motor abilities. Moreover, the measurement methods used in the studies are different. We also observed that the current literature reviews focus on the entire uniformed services population rather than on selected groups that may differ significantly from each other.

Therefore, this systematic review aims to present the current knowledge on the motor abilities of special forces operators worldwide and identify the methods used to assess them. A systematic review of the motor profile of a Special Forces Unit Operator is essential for creating more effective planning of the selection and training process. In addition, it will support preparing candidates for the selection process.

Method

Study design

The systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 (Page et al. 2021) Figure 1 shows the PRISMA checklist.

Search Strategy

The two lead authors (W.P. and F.S.) conducted a comprehensive search of three databases (Scopus, PubMed, and Web of Science) in February 2024. Subsequently, the database search was updated up to 15 May 2026, using the same search strategy. Our inclusion criteria were limited to studies assessing the level of motor skills of special forces operators. Due to the lack of a systematic review focusing exclusively on the motor profile of special forces operators, all scientific articles without a limitation on publication time were considered. The articles included in this review met the following criteria: (1) Research conducted on a population of special forces operators. (2) Men who were healthy and had no injuries during the study. (3) Studies analyzing the components of physical fitness. (4) Only original and full-text studies written in English. Articles were excluded in which the study: (1) included women, since special forces around the world are predominantly made up of men, and the inclusion of women could affect the analysis and interpretation of results, due to the physiological differences between the sexes, (2) included candidates for special forces units. (3) assessed motor skills with additional loading, and (4) was conducted after a planned training intervention or supplementation. The protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols INPLASY on 22 May 2024 (INPLASY202450106).

The search terms applied to a specific database search are shown in Table 1. The conjunction connected key search terms "AND" and similar search terms were connected by the conjunction "OR." The asterisk (*) stands for truncation.

Table 1. Search terms and keywords used in each database

Key search terms	Related search terms
Soldiers	soldier* OR operator* OR army OR military
Special forces	”special force*” OR ”special operation*” OR ”elite unit*” OR elite OR commandos* OR “tactical athlete*”
Motor abilities	”motor profile*” OR ”motor skill*” OR ”fitness profile*” OR ”physical fitness” OR fitness OR speed OR endurance OR strength OR flexibility OR jump* OR exercise* OR power OR agility OR condition*

Screening Strategy and Study Selection

After completing the database search, all articles were exported to the EndNote X20 reference manager (Thomson Reuters, Philadelphia, PA, USA). The next step was to remove duplicate items from the database. This was followed by an analysis of titles and abstracts for the inclusion of articles. The final step was to search the full text of the article, and a decision was made on whether to include or exclude the article. All concerns were consulted with co-authors. Two authors (W.P. and F.S.) carried out the screening strategy and study selection. When in doubt, a third author (K.P.) was consulted.

Data Extraction and Harmonization

The data extraction and harmonization of the included studies in this systematic review are presented in Tables 3 and 4. Table 3 presents the characteristics of the sample, while Table 4 shows the research methods, the tests used, the motor skills analyzed, and the main results.

Study Quality and Risk of Bias

Assessment of study quality and risk of bias was conducted using the Joanna Briggs Institute (JBI) critical appraisal checklist for analytical cross-sectional studies (Moola et al. 2017). The instrument assesses risk of bias with eight questions:

1. Were the criteria for inclusion in the sample clearly defined?

2. Were the study subjects and the setting described in detail?

3. Was the exposure measured in a valid and reliable way?

4. Were objective, standard criteria used for measurement of the condition?

5. Were confounding factors identified?

6. Were strategies to deal with confounding factors stated?

7. Were the outcomes measured in a valid and reliable way?

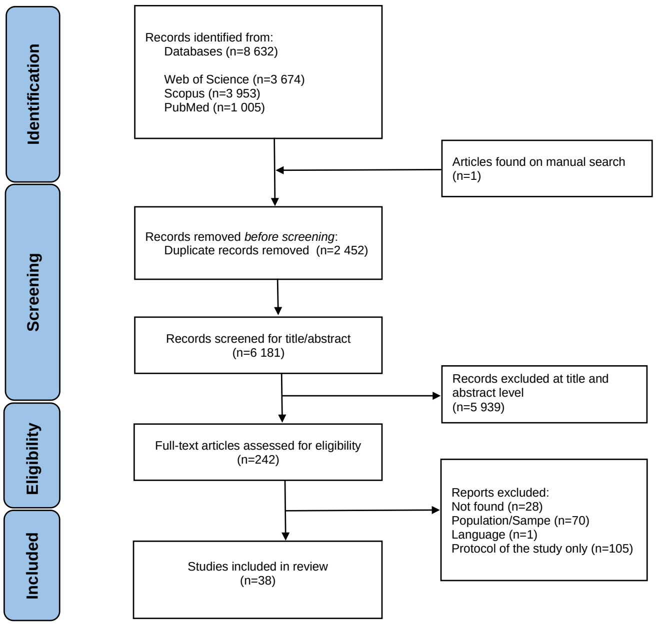
8. Was appropriate statistical analysis used?

Each criterion was rated as: yes, unclear, or no. Each study was then given a final grade according to the rules of the manual. The overall risk of bias resulted from the eight criteria evaluated. A low risk of bias was associated with articles that met all requirements or were missing one of the eight criteria. Moderate risk of bias was considered in articles missing 2-3 of the criteria. A high risk of bias was due to 4 or more unmet criteria. The risk of bias analysis is shown in Table 2.

Results

The flowchart is presented in Figure 1. At the identification stage of the three databases, 8 632 articles were found. During the article review, one article was found manually. Of these articles, duplicates (n = 2 452) were removed. After the duplicate removal stage, 6 181 articles were analyzed for title and abstract. During the title and abstract analysis, 5 939 articles that did not meet the inclusion criteria were removed. Two hundred forty-three articles were included in the full-text analysis stage. The full-text analysis excluded 28 articles due to failure to find the complete text, one article was excluded due to the language of publication, and 70 articles due to the study group, which included, for example, candidates, women, or a test with an additional load. In addition, 106 articles were excluded due to the study protocol, as they did not present motor skills assessments or did not contain results. In this sense, 38 articles that met all criteria were included in this systematic review.

Figure 1. Flowchart of the study selection process



Study Quality and Risk of Bias

The methodological quality of the included articles was analyzed in Table 2. Twenty-one articles were classified with a low risk of bias, 16 with a moderate risk of bias, and one with a high risk of bias. A detailed analysis showed that each article analyzed clearly defined the criteria for inclusion in the sample. Two articles vaguely described the participants and conditions of the study. Also, an exposure analysis showed that only one article vaguely describes whether it was measured correctly and reliably. The same article is the only one that vaguely states whether objective and standard criteria were used for measurement. Thirteen articles vaguely define disruptive criteria and fourteen articles vaguely define strategies for dealing with disruptive factors, while in four articles these factors were not identified. Each article was assessed validly and reliably, the results were measured, and appropriate statistical analysis was applied. This process was carried out by two authors (W.P. and F.M.), and in case of doubt, a third author was consulted (P.M.).

Table 2. Assessment of risk of bias

Study	1	2	3	4	5	6	7	8	Overall risk of Bias
Fothergill and Sims (2003)	yes	yes	yes	yes	yes	yes	yes	yes	Low
Różański et al. (2020)	yes	yes	yes	yes	yes	yes	yes	yes	Low
Eagle et al. (2019)	yes	yes	yes	yes	yes	yes	yes	yes	Low
Thorlund et al. (2011)	yes	yes	yes	yes	yes	yes	yes	yes	Low
Ross et al. (2023)	yes	yes	yes	yes	yes	yes	yes	yes	Low
Hoffman et al. (2016)	yes	yes	unclear	unclear	no	no	yes	yes	High
Solberg et al. (2015)	yes	yes	yes	yes	unclear	unclear	yes	yes	Moderate
Strandenes et al. (2013)	yes	no	yes	yes	unclear	unclear	yes	yes	Moderate
Tornero-Aguilera et al. (2017)	yes	yes	yes	yes	no	no	yes	yes	Moderate
Tomczak (2013)	yes	yes	yes	yes	unclear	unclear	yes	yes	Moderate
Sporiš et al. (2012)	yes	yes	yes	yes	unclear	unclear	yes	yes	Moderate
Farina et al. (2017)	yes	yes	yes	yes	yes	yes	yes	yes	Low
Muza et al. (1987)	yes	yes	yes	yes	unclear	unclear	yes	yes	Moderate
Zalleg et al. (2020)	yes	yes	yes	yes	yes	yes	yes	yes	Low
Junianto et al. (2023)	yes	yes	yes	yes	no	no	yes	yes	Moderate
Johnson et al. (2019)	yes	unclear	yes	yes	yes	yes	yes	yes	Low
Jensen et al. (2016)	yes	yes	yes	yes	unclear	unclear	yes	yes	Moderate
Dhabi et al. (2015)	yes	yes	yes	yes	yes	yes	yes	yes	Low
Taylor et al. (2019)	yes	yes	yes	yes	yes	yes	yes	yes	Low
Nieto et al. (2018)	yes	yes	yes	yes	no	no	yes	yes	Moderate
Degueldre (2023)	yes	unclear	yes	yes	yes	yes	yes	yes	Low
Zadarko et al. (2025)	yes	yes	yes	yes	yes	yes	yes	yes	Low
Ross et al (2026)	yes	yes	yes	yes	yes	unclear	yes	yes	Low
Bellido-Esteban et al. (2022)	yes	yes	yes	yes	unclear	unclear	yes	yes	Moderate
Sperlich et al. (2011)	yes	yes	yes	yes	yes	yes	yes	yes	Low
Degueldre et al. (2021)	yes	no	yes	yes	unclear	unclear	yes	yes	Moderate
Paredes-Ruiz et al. (2023)	yes	yes	yes	yes	yes	yes	yes	yes	Low
Wood and Swain (2021a)	yes	yes	yes	yes	yes	yes	yes	yes	Low
Ross et al. (2020)	yes	yes	yes	yes	unclear	unclear	yes	yes	Moderate
Wood and Swain (2021b)	yes	yes	yes	yes	unclear	unclear	yes	yes	Moderate
Hoffman et al. (2014)	yes	yes	yes	yes	yes	yes	yes	yes	Low
Royer et al. (2018)	yes	yes	yes	yes	unclear	unclear	yes	yes	Moderate
Carver and Winsmann (1970)	yes	yes	yes	yes	unclear	unclear	yes	yes	Moderate
Parr et al. (2015)	yes	yes	yes	yes	yes	yes	yes	yes	Low
Dhahbi et al. (2018)	yes	yes	yes	yes	yes	yes	yes	yes	Low
Hoffman et al. (2015)	yes	yes	yes	yes	yes	yes	yes	yes	Low
Tomczak et al. (2014)	yes	yes	yes	yes	unclear	unclear	yes	yes	Moderate
Connaboy et al. (2018)	yes	yes	yes	yes	yes	yes	yes	yes	Low

1 – Were the criteria for inclusion in the sample clearly defined? ; 2 – Were the study subjects and the setting described in detail?; 3 – Was the exposure measured in a valid and reliable way?; 4 – Were objective, standard criteria used for measurement of the condition?; 5 – Were confounding factors identified?; 6 – Were strategies to deal with confounding factors stated?; 7 –Were the outcomes measured in a valid and reliable way?; 8 – Was appropriate statistical analysis used?

Intervention Characteristics

Table 3 shows the characteristics of the groups in the articles analyzed, which include the number of special forces operators included in the study, the military unit to which the operators belong, age, weight, and body height. In total, 2 923 special forces operators were analyzed. The most extensive study of special forces operators was conducted by Dhahbi et al. (2018), considering 466 commandos of the Tunisian National Guard. The smallest group analyzed was seven special forces operators from the Navy Special Forces Unit (Strandenes et al. 2013). Seven articles characterized special forces operators divided into two groups (Fothergill and Sims, 2003; Ross et al. 2023; Bellido-Esteban et al. 2022; Wood and Swain, 2021; Connaboy et al. 2018; Hoffman et al. 2015; Hoffman et al. 2014).

The youngest group of special forces operators was observed in Hoffman et al. (2015), aged 19.6 ± 0.5. The special forces operators in the study by Jensen et al. (2016) had the highest age (36.8 ± 2.2 years). In the case of Taylor et al. (2019), the average age was not calculated, but the sample comprised 13 special forces operators over 40. The group of special forces operators in the study by Ross et al. (2023) had the highest average body weight (89.7±9.2 kg), while the lowest was observed by Hoffman et al. (2015), which was 72.1 ± 4.5 kg. The highest mean body height was observed in special forces operators in the study by Sperlich et al. (2011), which was 183.3 ± 6.2 cm. The lowest body height was shown in the study by Junianto et al. (2023) and was 169.7 ± 3.7 cm.

Table 3. Characteristics of the Groups Included in the Systematic Review

Study	N	Special forces unit	Age	Body weight (kg)	Body height (cm)
Fothergill and Sims (2003)	19	Navy SEALs	G1=29.2±4.2 G2=29.7±5.8	G1=83.7±6.3 G2=84.7±11.5	G1=180±4.7 G2=178.2±8.2
Różański et al. (2020)	15	Polish SF	33.1±3.5	78.5±5.2	179.9±6.4
Eagle et al. (2019)	140	US Air Force SF	27.3±5.0	83.2±8.3	177.5±5.9
Thorlund et al. (2011)	9	Danish National Guard Special Support and Reconnaissance unit	32.6±6.0	83.3±4.9	181.0±4.9
Ross et al. (2023)	155	United States Marine Forces Special Operations Command	G1=30.8±4.1 G2=28.0±5.3	G1=89.7±9.2 G2=85.9±12.6	G1=179.0±7.0 G2=178.0±6.0
Hoffman et al. (2016)	16	SF unit of the Israel Defense Forces	19.9±0.8	74.1±5.8	177.6±6.6
Solberg et al. (2015)	22	Norwegian Navy Special Operations Command	28.0±4.0	83.0±6.0	182.0±6.0
Strandenes et al. (2013)	7	Navy SF unit	N/A	N/A	N/A
Tornero-Aguilera et al. (2017)	20	Spanish Army elite unit	28.5±6.4	~80.1	178.5±6.1
Tomczak (2013)	8	Polish SF	25–33	71–95	170–188
Sporiš et al. (2012)	12	Croatian Armed Forces for Special Operations Battalion	24.7±2.6	79.9±7.1	176.6±6.1
Farina et al. (2017)	100	U.S. Army Special Operations	33.4±4.9	85.1±9.3	~179.9
Muza et al. (1987)	12	U.S. Army SF	27.3±5.7	79.4±11.4	180.5±7.1
Zalleg et al. (2020)	37	Antiterrorism soldiers from the Tunisian National Commandos School	23.3±1.5	78.7±9.7	179.7±4.3
Junianto et al. (2023)	43	Indonesian elite Air Force	Me(min-max) 27(23–30)	Me(min-max) 65(56–80)	169.7±3.7
Johnson et al. (2019)	121	Air Force Special Operations Command	27.6±5.2	83.8±8.3	177.4±5.8
Jensen et al. (2016)	18	US Naval Special Warfare Operators	36.8±2.2	89.1±1.2	181.5±1.4
Dhabi et al. (2015)	21	Tunisian National Guard commandos	24.1±1.8	74.9±5.1	179.5±4.0
Taylor et al. (2019)	40	US Navy Explosive Ordnance Disposal operators	25-29yrs=8 39yrs=19 40+yrs=13	FAT=17.9±3.7%	N/A
Nieto et al. (2018)	42	Chilean military special operation Army	27.4±3.9	73.6±7.8	173.0±0.1
Degueldre (2023)	7	Belgian SF	N/A	N/A	N/A
Zadarko et al. (2025)	24	Polish SF unit	34.8±4.0	85.5±8.1	180.4±5.0
Ross et al (2026)	54	United States SFO	23.5-30.77	Me±IQR:89.4±9.1	Me:180
Bellido-Esteban et al. (2022)	43	SF of the Spanish armed forces	G1=34.7±8.6	G1=86.4±10.6 G2=80.7±16.3	G1=178.1±7.9 G2=172.2±9.1
Sperlich et al. (2011)	120	Squad members of SF	28.9±5.2	N/A	183.3±6.2
Degueldre et al. (2021)	14	Belgian SFO	N/A	N/A	N/A
Paredes-Ruiz et al. (2023)	10	Air Force Parachute Sapper Squadron	27.75±4.20	75.7±8.8	173.3±5.7
Wood and Swain (2021a)	333	U.S. Naval SFO	28.4±5.0	86.0±9.2	178.4±6.2
Ross et al. (2020)	78	Marine Corps SFO Command	28.4±6.0	84.3±9.4	178.3±6.7
Wood and Swain (2021b)	G1:15 G2:305	US Naval Special Warfare	G1=31.2±5.1 G2=28.8±5.2	G1=89.4±10.0 G2=85.8±9.7	G1=181.4±6.4 G2=177.6±12.0
Hoffman et al. (2014)	20	Elite combat unit - Israel Defence Forces	G1=20.1±0.7 G2=20.2±1.1	G1=78.3±9.7 G2=79.6±7.8	G1=179.0±0.7 G2=180.0±0.5

Royer et al. (2018)	164	Marine Corps SFO Command - Critical Skills Operators	27.5±3.8	85.7±9.1	178.7±6.5
Carver and Winsmann (1970)	149	SF soldiers	19-39	75.09	176.18
Parr et al. (2015)	86	U.S. SFO	32.6±6.4	86.0±10.8	179.2±5.6
Dhahbi et al.(2018)	466	Tunisian National Guard commandos	24.2±2.5	76.8±6.7	178.3±5.3
Hoffman et al. (2015)	18	Elite combat unit - Israel Defence Forces	G1=19.6±0.5 G2=20.2±1.0	G1=72.1±4.5 G2=76.4±6.1	G1=176±0.5 G2=179±0.8
Tomczak et al. (2014)	20	"GROM" Polish SF Unit	30.0±3.4	85.8±10.00	179.5±6.6
Connaboy et al. (2018)	140	Air Force SFO	G1=27.1±4.4 G2=28.1±6.6	G1=83.6±8.4 G2=84.4±8.4	G1=177.7±6.0 G2=177.2±5.4

Note: N – Sample; G1 – group one; G2 – group two; N/A – no data available; Me – median; yrs – years; SF – Special Forces; SFO – Special Forces Operators

Methods of assessing motor abilities

Table 4 presents the main results of the analyzed articles regarding measurement methods, motor abilities, and results, focusing exclusively on the baseline data of special forces operators.

Aerobic capacity was the most frequently assessed ability (27 authors: Fothergill and Sims, 2003; Eagle et al. 2019; Ross et al. 2023; Hoffman et al. 2016; Solberg et al. 2015; Strandenes et al. 2013; Sporiš et al. 2012; Muza et al. 1987; Jensen et al. 2016; Taylor et al. 2019; Nieto et al. 2018; Wood and Swain, 2021a; Junianto et al. 2023; Paredes-Ruiz et al. 2023; Ross et al. 2020; Degueldre et al. 2021; Bellido-Esteban et al. 2022; Sperlich et al. 2011; Wood and Swain, 2021b; Royer et al. 2018; Dhahbi et al. 2018; Connaboy et al. 2018; Hoffman et al. 2015; Hoffman et al. 2014; Tomczak et al. 2014; Degueldre et al. 2023; Zadarko et al. 2025). Eleven articles used timed distance runs (2–5 km), predominantly analyzing travel time (Hoffman et al. 2016; Solberg et al. 2015; Sporiš et al. 2012; Nieto et al. 2018; Wood and Swain, 2021a/b; Bellido-Esteban et al. 2022; Dhahbi et al. 2018; Hoffman et al. 2014/15; Tomczak, 2014). Treadmill incremental tests were used in 11 trials to determine VO2max (Eagle et al. 2019; Strandenes et al. 2013; Muza et al. 1987; Jensen et al. 2016; Taylor et al. 2019; Paredes-Ruiz et al. 2023; Ross et al. 2020; Degueldre et al. 2021; Sperlich et al. 2011; Royer et al. 2018; Connaboy et al. 2018).

Evaluated by eleven authors (Eagle et al. 2019; Ross et al. 2020; Solberg et al. 2015; Sporiš et al. 2012; Wood and Swain, 2021a/b; Ross et al. 2023; Carver and Winsmann, 1970; Connaboy et al. 2018; Hoffman et al. 2015; Ross et al. 2026). Methods included the Wingate test (Eagle et al. 2019; Ross et al. 2020; Connaboy et al. 2018), shuttle runs (Wood and Swain, 2021a/b; Carver and Winsmann, 1970), and specific sprint tests (Ross et al. 2023; Sporiš et al. 2012; Ross et al. 2026).

Strength was analyzed by 25 authors (Różański et al. 2020; Eagle et al. 2019; Thorlund et al. 2011; Ross et al. 2023; Solberg et al. 2015; Strandenes et al. 2013; Tomczak, 2013; Sporiš et al. 2012; Farina et al. 2017; Johnson et al. 2019; Jensen et al. 2016; Zalleg et al. 2020; Dhahbi et al. 2015; Nieto et al. 2018; Wood and Swain, 2021a/b; Ross et al. 2020; Royer et al. 2018; Carver and Winsmann, 1970; Parr et al. 2015; Dhahbi et al. 2018; Connaboy et al. 2018; Hoffman et al. 2015; Tomczak et al. 2014; Ross et al. 2026). Common assessments included 1-RM tests (Solberg et al. 2015; Sporiš et al. 2012; Jensen et al. 2016; Dhahbi et al. 2015; Wood and Swain, 2021a/b), pull-ups (Strandenes et al. 2013; Sporiš et al. 2012; Dhahbi et al. 2015/18; Nieto et al. 2018; Carver and Winsmann, 1970; Tomczak et al. 2014), and isokinetic measurements (Johnson et al. 2019; Ross et al. 2020; Royer et al. 2018; Parr et al. 2015; Connaboy et al. 2018).

Power was measured by 14 authors (Eagle et al. 2019; Thorlund et al. 2011; Ross et al. 2023; Solberg et al. 2015; Tornero-Aguilera et al. 2017; Sporiš et al. 2012; Zalleg et al. 2020; Dhahbi et al. 2015; Wood and Swain, 2021a/b; Ross et al. 2020; Bellido-Esteban et al. 2022; Connaboy et al. 2018; Ross et al. 2026), primarily through jump tests and medicine ball throws.

Eight articles identified agility (Ross et al. 2023; Solberg et al. 2015; Tomczak, 2013; Sporiš et al. 2012; Wood and Swain, 2021a/b; Tomczak et al. 2014; Ross et al. 2026), mainly using the Pro-agility test. Speed was assessed by five authors (Ross et al. 2023; Tomczak, 2013; Sporiš et al. 2012; Bellido-Esteban et al. 2022; Ross et al. 2026). Flexibility was evaluated by five authors using various protocols like FMS or sit-and-reach (Solberg et al. 2015; Sporiš et al. 2012; Carver and Winsmann, 1970; Parr et al. 2015; Connaboy et al. 2018).

Table 4. Main Results of the Studies Included in The Systematic Review

Study	Methods	Physical abilities and parameters	Main results
Fothergill and Sims (2003)	Cooper test	aerobic capacity	G1: d= 2839±192 m ; G2: d=2667±187 m
Różański et al. (2020)	Hand grip	upper body strength	max=392.4±49.2 N
Eagle et al. (2019)	Incremental treadmill protocol Wingate test Isometric strength (Ankle)	aerobic capacity anaerobic capacity, power lower body strength	Vo$_2$max=49.6±5.1 ml/kg/min Power=9.1±0.7 W/kg right eversion=36.3±6.3 N/kg right inversion=30.9±6.7 N/kg left eversion=39.6±7.1 N/kg left inversion=30.3±6.3 N/kg
Thorlund et al. (2011)	Isometric strength (Knee) CMJ	lower body strength jump, power	MVC=228.4±14.2 Nm h=36.0±0.7 cm; peak power=3374±63 W
Ross et al. (2023)	Sprint 27, 4 m (30 yd) Vertical jump Pro-agility test 3.6-kg medicine ball throw IMTP 30-second maximal run 5-minute maximal run	speed power, jump agility power overall strength anaerobic capacity aerobic capacity	(Me±IQR) G1: t=4.61±0.31 s; G2: t=4.70±0.39 s G1: height=63.5±8.4 cm; G2: h=60.5±9.1 cm G1: t=4.87±0.32 s; G2: t=5.04±0.44 s G1: d=4.85±0.59 m; G2: d=4.56±0.63 m G1=2898.0±788.4 N; G2= 2453.2±673.9 N G1: d=144.6±23.0 m; G2: d=130.3±21.3 m G1: d=771.2±68.1 m; G2: d=718.9±77.8 m
Hoffman et al. (2016)	3-minute All-out Run 2.5 km run	aerobic/anaerobic capacity aerobic capacity	d=789.64±54.49 m; critical v=4.09±0.41 m/s; anaerobic d=78.56±21.94 m t=612.59±34.38 s
Solberg et al. (2015)	1-RM Bench-press 1-RM Leg-press Brutal-bench 9-kg medicine ball throw CMJ Standing long jump Pro-agility test 3000 m run EVAC test FMS	upper body strength lower body strength core strength power power, jump power, jump agility aerobic capacity anaerobic capacity flexibility	1-RM=104±11 kg 1-RM=300±38 kg reps=14±3 d=3.9±0.4 m h=41.4±3.1 cm d=234±16 cm t=5.2±0.2 s VO$_2$max=60±4.2 t=11.1±1 min t=49±8 s point=18±2
Strandenes et al. (2013)	Incremental treadmill test Push-ups Pull-ups	aerobic capacity upper body strength upper body strength	t=994±62 s VO$_2$max=61.1±3.7 ml/kg/min push-ups=50±7.3 reps pull-ups=15±5.9 reps
Tornero-Aguilera et al. (2017)	SJ CMJ ABK	power, jump power, jump power, jump	h=0.39±0.4 m h=0.42±0.04 m h=0.46±0.05 m
Tomczak (2013)	Hand grip 15-m sprint Shuttle run 3x5 m 15-m slalom run 15-m squat (Crouching start)	upper body strength speed agility agility speed	max strength=1005±102 N v=5.1±0.22 m/s v=3.08±0.13 m/s v=3.08±0.15 m/s v=2.86±0.39 m/s
Sporiš et al. (2012)	1-kg medicine ball throw Standing long jump 20-m sprint 1-RM thrust from the bench Push-ups in 2 minutes Sit-ups in 2 minutes Pull-ups Agility test 93639 with turn Sit and reach 3 200 m running 300 yards running	power power, jump speed upper body strength upper body strength lower body strength upper body strength agility flexibility aerobic capacity anaerobic capacity	d=32.8±2.21 cm d=204.78±6.32 cm t=3.81±0.17 s max=94.5±16.84 kg push-ups=75.17 ±18.26 reps sit-ups=86.42±11.77 reps pull-ups=13.17±2.95 reps t=8.45±0.41 s d=13.68±5.72 cm t= 793.5±63.99 s t=63.02±2.6 s
Farina et al. (2017)	Hand grip	upper body strength	max=57.3±7.5 kg
Muza et al. (1987)	Incremental treadmill protocol	aerobic capacity	VO$_2$max=55.2±4.3 ml/kg/min
Zalleg et al. (2020)	Countermovement Push-up exercises	upper body strength, power	F_0=0.53±0.04 BW; PGRF-T=1.12±0.13 BW RMFD=2.28±0.98 (BW · s^{-1}); FT=0.48±0.13 s; IF=1.55±0.59 BW; RIFD=42.15±32.53 (BW ·

	Squat Push-up exercises	upper body strength, power	s^{-1}) F_0=0.58±0.05 BW; PGRF-T=0.93±0.10 BW; RMFD=0.45±0.38 (BW · s^{-1}); FT=0.36±0.09 s; IF=1.65±0.56 BW; RIFD=48.41±49.53 (BW·s^{-1})
Junianto et al. (2023)	Cooper test	aerobic capacity	d=2876 m (2493–3410 m)
Johnson et al. (2019)	Isokinetic strength Shoulder (n=99) External rotation strength Internal rotation strength Protraction strength Retraction strength Elevation strength External/internal rotation SR Protraction/retraction SR Bilateral external rotation SA Bilateral internal rotation SA Bilateral protraction SA Bilateral retraction SA Bilateral elevation SA Isokinetic strength Scapula (n = 54) Protraction/retraction at 90° Downward/upward rotation at 90° Anterior/posterior tilt at 90° Protraction/retraction at 120° Downward/upward rotation at 120° Anterior/posterior tilt 120°	upper body strength	strength: 46.31±9.26 N·m/kg 69.14±18.70 N·m/kg 527.23±123.42 N·m/kg 529.71±119.02 N·m/kg 541.48±97.52 N·m/kg 0.70±0.17 N·m/kg 1.01±0.21 N·m/kg 9.11±6.49 N·m/kg 10.52±9.19 N·m/kg 10.95±8.35 N·m/kg 14.81±13.49 N·m/kg 9.54±6.14 N·m/kg Strength: 35.47±9.33 N·m/kg 27.29±6.29 N·m/kg −7.90±7.30 N·m/kg 39.18±10.90 N·m/kg 35.18±6.86 N·m/kg −4.41±9.13 N·m/kg
Jensen et al. (2016)	Incremental treadmill protocol 1-RM test for bench press 1-RM test for squat	aerobic capacity upper body strength lower body strength	VO_2max=49.3±1.4 ml/kg/min; VT=28.2±1.5 ml/kg/min max=112.0±3.2 kg max=122.0±11.6 kg
Dhahbi et al. (2015)	Five-Meter Rope-Climbing Test 9-kg medicine ball throw Hand grip Pull-ups Test (15 s) Push-ups Test (15 s) Est. 1-RM Bench Press	power power upper body strength lower body strength upper body strength upper body strength	execution t=15.55±3.48 s; APO=251.13±73.55 W; RPO=3.33±0.85 W/kg d=444.76±25.47 cm right hand=56.24±7.21 kg left hand=53.57±6.42 kg pull-ups=10.91±1.79 reps push-ups=18.33±2.39 reps est. 1-RM=80.65±7.06 kg
Taylor et al. (2019)	Incremental treadmill test	aerobic capacity	VO_2max=46.1±6.5 ml/kg/min; VT=26.7±5 ml/kg/min; time of termination=12±1.5 min; time of VT=5.9±1.3 min
Nieto et al. (2018)	Pull-ups Sit-ups (1 min) 2400-m run	upper body strength lower body strength aerobic capacity	pull-ups=11.2±2.5 reps sit-ups=49.1±5.1 reps t=589.1±40.7 s
Degueldre et al. (2023)	Running test to exhaustion	aerobic capacity	t=686.71±182.93 s
Zadarko et al. (2025)	20-m shuttle run	aerobic capacity	VO_2max=49.9±5.5 ml/kg/min
Ross et al. (2026)	Pro agility Vertical jump 30-second maximal run 30 yd sprint from prone 10 yd sprint from prone Medicine ball toss IMTP 5 min run	agility power, jump anaerobic capacity speed speed power strength aerobic/anaerobic capacity	t=4.84 ±0.24 s jump=25.4±4.1 cm d=154.5±20.4 m t=4.44±0.38 s t= 1.96±0.25 s d=186.5±34.0 Strength=286.5±72.0 kg d= 871.1±118.9 m
Bellido-Esteban et al. (2022)	Standing long jump Sprint 50 m 2000 m run	jump, power speed aerobic capacity	G1: d=181±30 cm; G2: d= 195±47 cm G1: t=8.72±0.98 s; G2: t=8.16±0.55 s G1:t=625.95±93.37 s; G2: t=562.36±62.46 s
Sperlich et al. (2011)	Incremental treadmill protocol	aerobic capacity	VO_2max=57.4±4.3 ml/kg/min
Degueldre et al. (2021)	Incremental treadmill protocol	aerobic capacity	G1: VO_2max=53.96±7.66 ml/kg/min; G2: VO_2max=54.38±4.79 mL/kg/min
Paredes-Ruiz et al. (2023)	Incremental treadmill test	aerobic capacity	v=14.17±0.67 km/h; t=9.19±0.61 min; VO_2max=54.20±5.88 ml/kg/min
Wood and Swain (2021a)	Standing long jump Pro-Agility Test Right Pro-Agility Test Left	jump, power agility agility	G1: d=242±19 cm; G2: d=244±22 cm; G3: d=245±18 cm; G4: d=245±18 cm G1: t=4.93±0.28 s; G2: t=4.93±0.29 s; G3: t=4.99±0.29 s; G4: t=5.14±0.27 s G1: t=4.96±0.27 s; G2: t=4.92±0.30 s; G3: t=4.97±0.29 s; G4: t=5.23±0.32 s

	Body weight bench press	upper body strength	G1:=17.2±4.3 reps; G2=15.8±3.8 reps; G3=13.8±4.1 reps; G4=12.5±4.3 reps
	1-RM deadlift	overall strength	G1=155±22 kg; G2=180±19 kg; G3=185±25 kg; G4=195±32 kg
	274-m shuttle run	anaerobic capacity	G1: t=63.4±2.8 s; G2: t=63.5±3.1 s; G3: t=64.8±3.4 s; G4: t=67.5±3.8 s
	4.83-km run	aerobic capacity	G1: v=3.81±0.30 (m·s^{-1}); G2: v=3.72±0.38 (m·s^{-1}); G3: v=3.60±0.30 (m·s^{-1}); G4: v=3.40±0.31 (m·s^{-1})
	800-m open Water Swim	aerobic capacity	G1: v=1.00±0.11 (m·s^{-1}); G2: v =0.99±0.08 (m·s^{-1}); G3: v =0.99±0.10 (m·s^{-1}); G4: v =0.99±0.10 (m·s^{-1})
Ross et al. (2020)	Wingate test	anaerobic capacity, power	anaerobic capacity: G1=8.9 ±1.0 W/kg; G2=9.0±0.8 W/kg; G3=8.7±0.8 W/kg; G4=8.9±1.0 W/kg; G5=9.3±0.8 W/kg; G6=8.8±1.1 W/kg; G7=9.1±0.8 W/kg anaerobic power: G1=12.9±0.7 W/kg; G2=12.7±0.5 W/kg; G3=12.9±0.7 W/kg; G4=12.7±0.7 W/kg; G5=12.9±0.5 W/kg; G6=12.7±0.7 W/kg; G7=12.9±0.5 W/kg
	Isokinetic extension strength (Knee)	lower body strength	avg. knee extension: G1=2.5±0.5 xBW; G2=2.6±0.6 xBW G3=2.2±0.5 xBW; G4=2.6±0.5 xBW; G5=2.8±0.6 xBW; G6=2.5±0.6 xBW; G7=2.6±0.5 xBW peak strength knee extension: G1=2.6±0.5 xBW; G2=2.8±0.6 xBW; G3=2.3±0.6 xBW; G4=2.7±0.5 xBW; G5=3.0±0.6 xBW; G6=2.6±0.6 xBW; G7=2.8±0.5 xBW
	Isokinetic flexion strength (Knee)	lower body strength	avg. knee flexion: G1=1.3±0.3 xBW; G2=1.4±0.3 xBW; G3=1.1±0.2 xBW; G4=1.3±0.2 xBW; G5=1.5±0.3 xBW; G6=1.3±0.3 xBW; G7=1.4±0.2 xBW Peak strength knee flexion: G1=1.4±0.3 xBW; G2=1.5±0.3 xBW; G3=1.3±0.2 xBW; G4=1.4±0.2 xBW; G5=1.6±0.3 xBW; G6=1.4±0.3 xBW; G7=1.5±0.3 xBW
	Incremental treadmill test	aerobic capacity	VO_2max: G1=49.9±4.8 mL/kg/min; G2=51.1±5.3 mL/kg/min; G3=48.5±4.7 mL/kg/min; G4=51.0±4.8 mL/kg/min; G5=51.5±5.5 mL/kg/min; G6=50.1±4.8 mL/kg/min; G7=50.8±5.4 mL/kg/min V02 Max LT: G1=43.9±3.8 mL/kg/min; G2=46.1±4.5 mL/kg/min; G3=43.1±3.8 mL/kg/min G4=45.3±4.3 mL/kg/min; G5=46.0±4.4 mL/kg/min; G6=45.0±4.4 mL/kg/min; G7=44.9±4.2 mL/kg/min
Wood and Swain (2021b)	Standing long jump	jump, power	G1: d=250.0±12.9 cm; G2: d= 242.3±25.6 cm
	Pro-agility test	agility	G1: t= 4.79±0.20 s; G2: t= 4.97±0.29 s
	Body Mass bench press	upper body strength	G1=16.2±5.3 reps; G2=16.1±5.5 reps
	1-RM deadlift	overall strength	G1=206.9±18.5 kg; G2=178.7±23.9 kg
	274 m shuttle run	anaerobic capacity	G1: t=63.9±3.5 s; G2: t=64.3±3.5 s
	4,83 km run	aerobic capacity	G1: t=1 315.4±137.1 s; G2: t= 1 334.1±157.3 s
	800 m open water swim	aerobic capacity	G1: t= 777.6±49.8 s; G2: t=808.9±73.6 s
Hoffman et al. (2014)	4 km run	aerobic capacity	G1: t=942.4±39.3 s; G2: t=949.9±46.2 s Peak velocity: G1: 5.84±0.63 ms^{-1}; G2: 5.69±0.46 ms^{-1} Average velocity: G1: 4.25±0.22 ms^{-1}; G2: 4.18±0.19 ms^{-1}
Royer et al. (2018)	Incremental treadmill test	aerobic capacity	$V0_2$max=49.6±4.5 mL/kg/min $V0_2$max LT=44.7±3.9 mL/kg/min
	Isokinetic flexion strength (Knee)	lower body strength	strength=140.9±23.0 % BW strength=121.0±23.8 N·m
	Isokinetic extension strength (Knee)	lower body strength	strength=266.8±45.8 % BW strength=229.0±46.9 N·m

	Isokinetic extension strength (Trunk)	core strength	strength=407.8±77.5 % BW strength=348.9±76.7 N·m
	Isokinetic flexion strength (Trunk)	core strength	strength=242.1±39.6 % BW strength=207.5±41.0 N·m
Carver and Winsmann (1970)	Extent Flexibility	lexibility	extent=54.59±18.54 cm
	Dynamic Flexibility	flexibility	number of cycles=16.4±2.1 reps
	Shuttle Run (five 20-yard shuttles)	anaerobic capacity	t=21.5±1.1 s
	Softball Throw	upper body strength	throwing d=46.93±6.7 m
	Hand grip	upper body strength	strength=60.78±8.6 kg
	Pull-up	upper body strength	Pull-up=7.7±2.8 reps
	Leg Lifts (30 s)	core strength	Leg Lifts=23.4±2.5 reps
	Cable Jump	upper body strength	reps=4.1±1.6
	Balanced with eyes closed	balance	t=6.0±2.5 s
	600-Yard Run	aerobic/anaerobic capacity	t=132±15 s
Parr et al. (2015)	Isokinetic flexion strength (Knee)	lower body strength	rt=129.05±20.48 %BW; lt=126.44±21.82 %BW
	Isokinetic extension strength (Knee)	lower body strength	strength rt=231.59±42.44 % BW strength lt=224.73±36.42 % BW
	Knee flexion Flexibility	flexibility	strength rt=17.89±9.23 deg strength lt=20.54±9.93 deg
	Isokinetic extension strength (Trunk)	core strength	strength=300.85±69.86 % BW
	Isokinetic flexion strength (Trunk)	core strength	strength=191.39±33.42 % BW
	Isokinetic External rotation strength (Shoulder)	upper body strength	strength rt=38.84±6.33 % BW strength lt=38.59±7.05 % BW
	Isokinetic Internal rotation strength (Shoulder)	upper body strength	strength rt=60.57±11.54 % BW strength lt=59.02±11.86 % BW
	Shoulder External Flexibility	flexibility	strength rt=95.42±8.48 deg strength lt=95.10±9.51 deg
	Shoulder Internal Flexibility	flexibility	strength rt=58.35±11.30 deg strength lt=60.88±9.83 deg
Dhahbi et al. (2018)	Pull-ups (70 seconds)	upper body strength	G1=11.38±4.68 reps; G2=14.81±4.78 reps; G3=9.17±3.42 reps; G4=11.92±4.65 reps
	Sit-up (70 seconds)	lower body strength	G1=43.76±6.96 reps; G2=49.86±6.12 reps; G3=34.67±7.38 reps; G4=43.53±7.23 reps
	Push-up (70 seconds)	upper body strength	G1=40.19±8.40 reps; G2=50.88±7.16 reps; G3 =32.04±8.58 reps; G4 =41.10±9.54 reps
	5 km cross country	aerobic capacity	G1: t=1405.25±222.30 s; G2: t=1239.76 ±123.78 s; G3: t=1178.62±100.22 s; G4: t=1336.88±184.31 s
Hoffman et al. (2015)	2.5 km run	aerobic capacity	G1: t=624.0±22.6 s; G2: t=633.0±25.3
	1 min sprint	aerobic/anaerobic capacity	Avgerage: G1: v=3.97±0.17 ms^{-1}; G2: v=3.94±0.14 ms^{-1} Peak: G1: v=6.68±0.36 ms^{-1}; G2: v=6.71±0.48 ms^{-1} Average: G1: v=5.21±0.28 ms^{-1}; G2: v=5.19±0.33 ms^{-1}
	50 m casualty carry (60 kg manikin)	overall strength	G1: t=15.60±1.16 s; G2: t=14.64±0.73 s Average sprint: G1: t=7.42±0.24 s; G2: t=7.43±0.26 s
	Repeated sprints and shooting performance	anaerobic capacity	Fatigue rate: G1: 91.6±4.8 %; G2: 93.8±1.8 %
Tomczak et al. (2014)	3000 m run	aerobic capacity	t=11.57±0.50 min
	Sit-ups	lower body strength	reps =91.50±5.30
	Pull-ups	upper body strength	reps =18.27±2.0
	Shuttle run 10×10 m	agility	t=28.8±0.69 s
	Back flip	agility	reps=10.41±2.70
	Bending arms on bars	upper body strength	reps=30.82±4.63
Connaboy et al. (2018)	Incremental treadmill protocol	aerobic capacity	G1: VO_2max=49.6±5.0 ml/kg/min; G2: VO_2max=49.0±5.2 ml/kg/min
	Wingate test	anaerobic capacity. power	G1: power=13.3±0.9 W/kg; G2: power=13.8±0.9 W/kg
	Isokinetic extension strength (Knee)	lower body strength	G1: strength Rt=250.3±48.3 % BW; G2: strength Rt=242.8±43.2 % BW G1: strength lt=247.3±48.1 % BW; G2: strength lt=242.0±42.6 % BW
	Isokinetic flexion strength (Knee)	lower body strength	G1: strength Rt=131.8±20.8 % BW; G2: strength Rt=131.1±24.1 % BW G1: strength lt=129.4±22.5 % BW; G2: strength lt=127.6±20.5 % BW
	Isokinetic eversion strength (Ankle)	lower body strength	G1: strength Rt=36.1±6.2 % BW; G2: strength Rt=36.9±6.4 % BW G1: strength lt=36.1±6.2 % BW; G2: strength lt=36.9±6.4 % BW
	Isokinetic inversion strength (Ankle)	lower body strength	G1: strength Rt=31.0±7.0 % BW;

		G2: strength Rt=29.4±4.9 % BW G1: strength lt=30.7±6.4 % BW; G2: strength lt=28.3±4.9 % BW
Hip extension range of motion	flexibility	G1: ROM Rt=26.0±5.8 deg; G2: ROM Rt=27.5±4.4 deg G1: ROM lt=24.2±5.8 deg; G2: ROM lt=24.5±4.3 deg
Knee active extension range of motion	flexibility	G1: ROM Rt=19.1±10.4 deg; G2: ROM Rt=15.4±9.1 deg G1: ROM lt=20.5±8.1 deg; G2: ROM lt=18.1±10.0 deg
Ankle dorsiflexion range of motion	flexibility	G1: ROM Rt=13.4±4.7 deg; G2: ROM Rt=14.2±4.0 deg G1: ROM lt=12.2±5.0 deg; G2: ROM lt=12.6±3.8 deg

Note: G1 – group one; G2 – group two; G3 – group three; G4 – group four; G5 – group five; G6 – group six; G7 – group seven; CMJ – counter movement jump; IMTP – Isometric Mid-Thigh Pull; 1-RM – one rep max; Me – median; IR – Interquartile range; MVC – Maximal muscle strength; VT – Ventilatory threshold; F0 – initial force supported; PGRF-T – peak ground reaction force takeoff; RMFD – rate of force development during takeoff; FT – flight time; IF – impact force; RIFD – rate of force development impact; APO – absolute power output; RPO – relative power output; est. – estimate; BW – body weight; t – time; d – distance; v – velocity; reps – repetitions; h – height.

Discussion

The study's main objective was a systematic review of studies assessing the level of motor skills of special forces operators. The study analyzed the motor abilities studied, the tests performed, and the results obtained by special forces operators in the included works. The authors mainly focused on assessing endurance, strength, and power.

Aerobic endurance capacity

Endurance was assessed in three categories: aerobic, anaerobic, and mixed. Aerobic endurance was the most frequent, being evaluated in 27 studies (Fothergill and Sims, 2003; Eagle et al. 2019; Ross et al. 2023; Hoffman et al. 2016; Solberg et al. 2015; Strandenes et al. 2013; Sporiš et al. 2012; Muza et al. 1987; Jensen et al. 2016; Taylor et al. 2019; Nieto et al. 2018; Wood and Swain, 2021a; Junianto et al. 2023; Paredes-Ruiz et al. 2023; Ross et al. 2020; Degueldre et al. 2021; Bellido-Esteban et al. 2022; Sperlich et al. 2011; Wood and Swain, 2021b; Royer et al. 2018; Dhahbi et al. 2018; Connaboy et al. 2018; Hoffman et al. 2015; Hoffman et al. 2014; Tomczak, et al. 2014; Degueldre et al. 2023; Zadarko et al. 2025). It is suggested that aerobic endurance is a crucial capability to maintain continuous combat readiness (Fothergill and Sims, 2003; Hoffman et al. 2015; Taylor et al. 2019). Combat tasks are often associated with long marches or runs over varied terrain (Hoffman et al. 2016). It should be noted that prolonged marching and running are usually related to additional load, which during a combat task can average 30 kg, while the load can vary depending on the task at hand (Wood and Swain, 2021a; Hoffman et al. 2016; Zadarko et al. 2025). Moving with an additional load can lower maximum oxygen consumption as a stressful situation is generated in the body. In addition, aerobic thresholds are reached at much higher percentages of HRmax and VO2max (Paredes-Ruiz et al. 2023). It has also been observed that the training of special forces units is based on a high volume of running, and training is mainly based on endurance (Sporiš et al. 2012). The authors point out that the level of aerobic endurance in special forces operators is at a high level and should be close to that of professional athletes (Eagle et al. 2019; Hoffman et al. 2016; Muza et al. 1987; Jensen et al. 2016; Ross et al. 2020). In addition, it has been observed that Operators of special forces units are characterized by a higher level of aerobic capacity than the unit responsible for support, conventional troops, or those who regularly exercise (Ross et al. 2023; Junianto et al. 2023; Tomczak et al. 2014). Higher levels of aerobic capacity can also offset or alleviate the effects of aging to some extent, allowing you to serve in the military longer (Taylor et al. 2019). Sperlich et al. (2011) suggest that analysis of aerobic endurance parameters should look at peak oxygen uptake (VO2max), the velocity at lactate threshold (V LT), and running economy (RE). Therefore, Royer et al. (2018) believe establishing physiological thresholds would better guide special forces units' selection process and training. In addition, creating performance standards for special forces operators could increase tactical effectiveness and reduce the risk of injury (Royer et al. 2018).

In summary, the frequently used tests are run over a certain distance, usually analyzing the time of covering the distance, and an incremental test on a mechanical treadmill, during which the VO2max parameter is usually analyzed. Similar conclusions were reached by Colmenero et al. (2014) and Maupin et al. (2018), who also observed that incremental running on a mechanical treadmill was the most commonly used method, with VO2max being the main parameter analyzed. On the other hand, the methodology of conducting the tests varies, differing by distance or change of load, which makes it difficult to compare the results.

Anaerobic and mixed endurance capacity

It is worth noting that no measurement methodology was repeated for the aerobic/anaerobic capacity analysis, and each author analyzed different parameters. While the method of assessing anaerobic strength is quite varied, it is worth highlighting the Wingate test, which was conducted three times (Connaboy et al. 2018; Eagle et al. 2019; Ross et al. 2020), and the testing protocols were similar, making it easier to compare the final results.

The specificity of the requirements for combat tasks is often referred to as anaerobic tasks, while the training program of soldiers is often not specific to the professional activities performed (Hoffman et al. 2015; Sporiš et al. 2012). Combat tasks may involve climbing cliffs, debris, vertical ascents on building structures, on a gas or oil platform, or boarding a moving ship at sea often with a time limit (Wood and Swain, 2021b; Sporiš et al. 2012). Anaerobic ability can also be crucial on the urban battlefield, where there may be repeated sprints between points of cover (Hoffman et al. 2015). Another combat task may be to quickly transport a wounded soldier on the battlefield to safety (Hoffman et al. 2015; Solberg et al. 2015). One study showed that the level of anaerobic capacity is related to the percentage of adipose tissue (Ross et al. 2023). It was also observed that operators of special forces units had higher levels of anaerobic capacity than the support group (Ross et al. 2023). Hoffman et al. (Hoffman et al. 2016) suggests that the 3-minute run is an effective and simple method to assess both aerobic and anaerobic capacity in soldiers. One argument is the ease of conduct, where we often face limited time in military units to conduct fitness tests (Hoffman et al. 2016; Ross et al. 2023). It is also believed that the 3-minute run can be an effective assessment of combat readiness, which simultaneously evaluates two motor skills (Hoffman et al. 2016).

Muscle strength

Muscle strength was the second most frequently assessed motor ability, examined in 25 studies (Różański et al. 2020; Eagle et al. 2019; Thorlund et al. 2011; Ross et al. 2023; Solberg et al. 2015; Strandenes et al. 2013; Tomczak 2013; Sporiš et al. 2012; Farina et al. 2017; Johnson et al. 2019; Jensen et al. 2016; Zalleg et al. 2020; Dhahbi et al. 2015; Nieto et al. 2018; Wood and Swain, 2021a; Ross et al. 2020; Wood and Swain, 2021b; Royer et al. 2018; Carver and Winsmann, 1970; Parr et al. 2015; Dhahbi et al. 2018; Connaboy et al. 2018; Hoffman et al. 2015; Tomczak et al. 2014; Ross et al. 2026). The wide range of tests and measurement protocols makes direct comparisons across studies difficult. Maupin et al. (2018) identified strength as the third most analyzed motor ability, emphasizing the common use of 1-RM, push-ups, and pull-ups. Colmenero et al. (2014) reported that, within military populations, strength is the second most frequently assessed ability, with squats being the most used test, followed by push-ups and hand grip.

Strength is an important motor ability during complex field tasks, and special forces operators require a high level (Ross et al. 2023; Solberg et al. 2015). It has been observed that during the missions of special forces units, one of the most valued abilities is strength when carrying, lifting, pulling heavy loads, or climbing (Sporiš et al. 2012; Farina et al. 2017; Dhahbi et al. 2015; Wood and Swain, 2021a). One of the main tasks that requires a high level of strength is carrying heavy loads (Ross et al. 2023; Farina et al. 2017). An example of the task of special forces operators is to move with an additional load, which can be 40% of body weight, even over a distance of 90 km (Sporiš et al. 2012; Wood and Swain, 2021a). Another task requiring sufficient strength is carrying the wounded on the battlefield (Tomczak, 2013; Wood and Swain, 2021a). Adequate levels of muscle strength can also prove crucial when climbing or overcoming various types of obstacles in a combat task area (Sporiš et al. 2012). The ability to differentiate force is believed to condition accuracy and economy in many combat tasks (Tomczak

2013). Additionally, Tomczak et al. (2013) suggest that variation in hand tightness strength may be one of the selection criteria for special forces units. Furthermore, Eagle et al. (2019) indicate that force asymmetry and body weight may significantly predict ankle joint injury in a multivariate model. For missions involving prolonged immobilization of the body, it can reduce muscle strength or the functional efficiency of muscles. It is believed that such effects can endanger special forces operators' lives in evacuation situations during a combat task (Thorlund et al. 2011).

Power

Power was assessed by 14 studies (Eagle et al. 2019; Thorlund et al. 2011; Ross et al. 2023; Solberg et al. 2015; Tornero-Aguilera et al. 2017; Sporiš et al. 2012; Zalleg et al. 2020; Dhahbi et al. 2015; Wood and Swain, 2021a; Ross et al. 2020; Bellido-Esteban et al. 2022; Wood and Swain, 2021b; Connaboy et al. 2018; Ross et al. 2026), most commonly through jump-based tests.

Similar to our results, the literature review by Maupin et al. (2018) suggests power is one of the most frequently assessed motor abilities in elite tactical units. The author also highlights that vertical jumping and medicine ball throwing were the most common measurement methods. An analysis by Colmenero et al. (2014) in their systematic review shows that the Wingate test was used several times to assess cardiorespiratory fitness, while vertical jumps and the long jump from a standing position were used as indicators of skeletal muscle strength.

Power is undoubtedly one of the key motor skills in special forces operators (Eagle et al. 2019; Ross et al. 2023; Sporiš et al. 2012; Zalleg et al. 2020; Dhahbi et al. 2015; Ross et al. 2020). Short-lived tasks of maximum intensity can often characterize combat tasks (Eagle et al. 2019). It is pointed out that the evaluation of only maximum force may be associated with insufficient functional evaluation of skeletal muscles during short-term loads (Thorlund et al. 2011). In addition, it has been shown that special forces operators can perform more inoffensive actions and perform better than non-elite troops during a combat task (Tornero-Aguilera et al. 2017). The high power level can be used during tasks such as overcoming obstacles, running uphill, throwing a grenade, shooting, short sprints, or lifting and carrying heavy loads (Sporiš et al. 2012). In addition, the high power level can be used during rope climbs, which can occur frequently during a combat task (Dhahbi et al. 2015; Sporiš et al. 2012; Dhahbi et al. 2018). An example of climbers might be trying to access a ship, gas, or oil platform (Wood and Swain, 2021b). Dhahbi et al. (2015) suggest that the 5-meter rope climbing test may be a practical test of upper limb power in special forces operators. Loss of adequate power levels can be a setback during a combat task or rapid evacuation (Thorlund et al. 2011). One test to assess the ability to maintain operational fitness in special forces operators may be the CMJ test (Thorlund et al. 2011). In summary, training special forces operators should consider the formation of upper body power (Wood and Swain, 2021b).

Agility

Eight studies assessed agility (Ross et al. 2023; Solberg et al. 2015; Tomczak 2013; Sporiš et al. 2012; Wood and Swain, 2021a; Wood and Swain, 2021b; Tomczak et al. 2014; Ross et al. 2026), highlighting a strong correlation between agility and anaerobic capacity and power (Ross et al. 2023). Agility and speed are motor skills that are less frequently analyzed among special forces operators. The only agility test that several authors have performed is the Pro-agility test. In the case of speed, the same measurement protocol was not observed, making it impossible to compare results. Maupin et al. (2018) also note that agility and speed assessments are used less frequently in the elite tactical unit population. Although agility tests are rarely used, Maupin et al. (2018) confirm that Pro-agility is the most common method to assess agility. Colmenero et al. (2014) also reported that the methodology for evaluating agility and speed is rare and varies widely.

Although fewer studies have been conducted on agility, the authors point out that agility and speed are also fundamental when conducting a military operation (Ross et al. 2023; Sporiš et al. 2012). Most of today's combat operations occur in local areas, resulting in many high-intensity tasks in a short period (Sporiš et al. 2012). Combat tasks are often based on executing rapid and precipitous movements, which are modified according to changing conditions (Tomczak, 2013). During a combat task, there may be such activities as sudden change of direction, crawling, swimming, climbing, parachute jumping, driving a vehicle under combat conditions, or engaging in direct combat (Tomczak, 2013; Sporiš et al. 2012). In addition, during a combat operation, special forces operators may also encounter many obstacles that they must overcome (Sporiš et al. 2012). Most special units use agility and speed tests during selection (Ross et al. 2023; Solberg et al. 2015; Tomczak, 2013; Sporiš et al. 2012; Wood and Swain, 2021a; Wood and Swain, 2021b; Tomczak et al. 2014). On the other hand, Jamro et al. (2022) believe that less attention can be paid to the running speed and agility of soldiers and suggest that the physical preparation of the modern soldier should focus on strength and endurance.

Flexibility and Balance

Assessments of flexibility and balance are not among the frequently analyzed motor abilities. Several authors have observed that not a single method has been used. Maupin et al. (2018) also observed a few articles that assessed flexibility, while none considered balance. It is worth noting that the author also singled out the sit and reach test to assess flexibility (Maupin et al. 2018). Colmenero et al. (2014) also highlighted the sit and reach test as a test repeated in articles as a determinant of skeletal muscle fitness. In addition, the author noted three articles that analyzed balance, while a different test was used in each (Colmenero et al. 2014).

It is essential to mention that a common cause of special forces operators' lack of combat readiness is musculoskeletal injuries (Connaboy et al. 2018). These injuries can often result from inadequate levels of flexibility (Parr et al. 2015; Connaboy et al. 2018). Parr et al. (2015) point out that too much posterior tension on the shoulder can restrict shoulder internal rotation, impingement, rotator cuff injury, or articular cartilage ruptures. Moreover, it has been observed that increased flexibility of the popliteal tendons reduced the number of lower extremity overload injuries (Parr et al. 2015). The author also points out that inadequate flexibility can increase the risk of re-injury of an already healed injury (Parr et al. 2015).

Operators of special forces units are responsible for the most responsible and risky military operations. Therefore, operators are required to have a high level of physical fitness in order to be able to meet the tasks at hand. In order for the level of physical fitness to be at an optimal level throughout the period of service, it is necessary to observe and assess the level of motor skills. A review of the literature suggests that the most commonly assessed motor abilities are aerobic and anaerobic endurance, muscular strength and power. Less frequently analyzed motor abilities include agility, speed, flexibility and balance.

Strengths and Limitations

Nevertheless, the main limitation of the study is the wide variation in research methods observed for each motor ability. in addition is the relatively small number of studies devoted to abilities such as balance and flexibility, which may be important in operational activities. The results of the review also indicate that the research methodology should be standardized so that motor profiles can be compared between different special forces units and even between other populations. This may be necessary to better understand what kind of motor profile operators of special forces units are mainly characterized by. In addition, the creation of a motor profile and a single battery of tests can assist in the process of selection, training, and accelerate the return of operators to full fitness after injury.

The systematic review conducted emphasizes the value of assessing motor skills in special forces operators. The study focuses exclusively on the motor profile of special forces operators, rather than the general military population. The article also provides important practical recommendations, emphasizing the need to standardize motor skills assessment methods in order to facilitate comparisons between units and the application of results in the selection, training, and rehabilitation of operators.

Conclusions

This review presented methods for assessing motor skills in special forces operators. In addition, the results achieved in the studies conducted were presented. The review revealed the degree of variability in the research protocols, which, as a consequence, makes it difficult to compare the results and reliably present the motor profile of special forces operators. Nevertheless, the research results highlighted which motor abilities lead and are most controlled in special forces operators. We can include aerobic and anaerobic endurance, strength, and power among the most significant motor abilities. Among the most common methods for assessing aerobic endurance are running, which involves covering 2 to 5 kilometers in the shortest possible time, and incremental tests on a mechanical treadmill. Methods for evaluating anaerobic endurance vary, while it is worth distinguishing the Wingate test, which has measurement protocols. Assessment of strength levels was most often analyzed using 1-RM. Push-ups and pull-ups are also worthy of mention. Among the less frequently analyzed motor skills, we can include agility, speed, flexibility, and balance. On the other hand, a literature review showed that these motor skills, which also play an essential role in the work of special forces operators, cannot be neglected either. The most common testing protocol for agility was the Pro-agility test, a sprint over a short distance for speed. The method for assessing flexibility was the sit and reach test, while for balance, only one study was observed, using Balance on a one-inch board with eyes closed.

The literature review provided an understanding of what motor profile should characterize a soldier of special forces units, and the results obtained can support the selection and training process. What's more, the results can help special forces operators return to full fitness after an injury, or the selection of appropriate methods of measuring physical fitness by a military unit.

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