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Cuff Selection and Blood Pressure Measurement Accuracy in Adults Engaged in Resistance Training. A Narrative Review

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Abstract

Background. Large upper arms can complicate blood pressure measurement in adults who undertake resistance training. Cuff circumference range, fit and the measurement system may influence the result.

Aim. To examine evidence on cuff selection in muscular arms and critically assess the applicability of studies in other adult populations to resistance training.

Materials and Methods. A purposive narrative synthesis combined four documented Europe PMC searches restricted to PubMed records with targeted publisher and reference-list searches. The original database searches returned 160 records, representing 150 unique PubMed records. Twenty-five publications with accessible full texts were retained for methodological assessment; one directly relevant study in bodybuilders was discussed separately using its indexed abstract. No meta-analysis was performed.

Results. A randomized cuff-size crossover trial and comparative studies in general adult populations showed that cuff dimensions, fit, positioning and device design can change readings. A separate abstract-reported comparison in 193 competitive bodybuilders identified cuff-dependent systolic differences, but its complete methods could not be assessed. The retained full-text evidence does not establish an optimal cuff design or muscularity-specific correction factor. The synthesis supports measured circumference, assessment of fit and validated device–cuff combinations.

Conclusions. Correct cuff selection is necessary before interpreting an elevated reading in a person who trains with resistance. Large muscular arms should not be assumed to have the same measurement characteristics as arms enlarged predominantly by adiposity. Elevated readings that persist after technical correction require standard clinical evaluation.

Keywords: blood pressure measurement; resistance training; bodybuilding; cuff size; arm circumference; oscillometry.

1 Introduction

1.1 Measurement accuracy in sports medicine

Clinical decisions about elevated blood pressure depend on how the measurement was obtained. European guidelines and major measurement statements place standardized technique within the diagnostic process, alongside repeated assessment and out-of-office measurements where indicated. Technical accuracy is therefore necessary before a result is used to classify risk or guide treatment [1,2,3].

Participation in sport does not exclude hypertension. Sports cardiology reviews identify accurate resting measurement as part of cardiovascular assessment and draw attention to cuff sizing in strength athletes with large upper arms. These reviews provide clinical context rather than a dedicated validation of cuff performance in a resistance-training cohort [4,5].

The practical question addressed here arises when a resistance-trained adult with a large arm has an unexpectedly high reading. Increasing cuff size without measuring the arm can introduce a different error, while attributing the result to muscle mass may delay recognition of hypertension. Technical assessment should therefore precede interpretation of the result [2,6].

1.2 Cuff selection and the scope of this review

Undercuffing describes use of a cuff that is too small for the arm; overcuffing describes use of a cuff that is too large. The resulting differences depend on the measurement system and cannot be represented by a single adjustment applicable to every person. Contemporary experimental evidence confirms the importance of matching cuff size to the individual [6].

Size is only one component of fit. Cuffs differ in geometry, bladder dimensions, closure and interaction with an oscillometric algorithm. A label such as “large” does not identify the same circumference range across manufacturers. The intended monitor–cuff combination and its validation are therefore more informative than a size name alone [7,8,9].

This narrative review examines resting upper-arm measurement in adults engaged in resistance training by assessing the applicability of full-text measurement studies, clinical recommendations and one clearly identified abstract-level athlete report. It distinguishes directly reported findings in competitive bodybuilders from evidence obtained in general or clinical adult samples. Exercise blood pressure thresholds, masked hypertension prevalence and diagnostic exercise testing are outside its principal scope.

1.3 Review question and contribution

The review asks which findings about cuff dimensions, geometry and validation can reasonably inform assessment of muscular arms, and where population-specific evidence remains insufficient. Earlier reviews address cuff fit, procedural error, hypertension in athletes and technological sources of bias [4,7,10,11]. The contribution proposed here is an appraisal of applicability, separating between-cuff disagreement, accuracy against a study reference and confirmation of a clinical hypertension diagnosis. Table 4 compares selected earlier reviews without claiming that this is the first review of the subject.

2 Research materials and methods

2.1 Review design and evidence selection

Four Europe PMC queries restricted to PubMed-origin records (SRC:MED) were executed. They combined blood pressure and cuff terms with muscular or athletic arms, wide-range validation, conical shape, or randomized cuff-size comparisons. The searches returned 62, 50, 24 and 24 records: 160 before deduplication and 150 unique PMIDs. Search strings and the record inventory were retained in the working materials. These counts describe the original narrative search, not a complete systematic eligibility flow.

Titles and indexed abstracts were used to identify candidate reports; inclusion in the full-text critical synthesis additionally required access to the complete article. Eligible sources addressed resting upper-arm cuff selection, arm anatomy, monitor validation, procedural error or clinical measurement recommendations applicable to adults. Sports cardiology reviews supplied the athletic context. Blood-flow-restriction interventions without a resting measurement question, pediatric-only and animal studies, and cuffless-device validation studies were excluded. A general technology survey was used only for interpretation of cuff-based methods. English-language publications were considered without a fixed lower year limit.

Targeted PubMed, publisher, PubMed Central and reference-list checks supplemented the original inventory and established full-text availability. Twenty-five publications were selected purposively for full-text synthesis across measurement experiments, anthropometry, population surveys, reviews and guidance. One directly relevant comparison in competitive bodybuilders by Fonseca-Reyes et al. [26] was identified and summarized solely from its PubMed-indexed abstract; it was not included in the 25 full-text publications or in their methodological appraisal. No other abstract-only reports were included. The original four database searches were not rerun, and the bibliography is not a claim that all relevant publications were identified. PMIDs, DOIs and titles were used to check duplicates.

2.2 Source access and extraction

Complete texts for the 25 critically appraised publications were obtained from PubMed Central, publisher pages, an institutional repository or a publicly accessible copy of the published article. The bibliography identifies their full-text locations. Extraction and descriptive appraisal used the methods, results, tables and disclosures rather than the abstract alone. For the separately discussed athlete report [26], only the indexed abstract was available, so its reported comparisons could be described but detailed methods, validation and risk of bias could not be assessed. Supplementary material was consulted where relevant to the retained full-text statements; availability of the main text was not treated as proof that participant-level data were accessible.

Extraction considered population, sample size, device and cuff configuration, comparator, reported differences, validation criteria, funding and applicability to resistance training. A difference between two noninvasive readings was distinguished from accuracy against an auscultatory or invasive reference. ESH and AHA measurement statements and the JACC expert panel provided the clinical framework [2,3,12].

2.3 Synthesis and methodological limits

Results were compared qualitatively using a descriptive appraisal of within-person comparison, order or randomization, reference method, arm-size representation, population applicability, device specificity, declared sponsorship and source access. These domains were applied to the principal empirical reports and summarized in Table 3. This was not a validated risk-of-bias score or a GRADE assessment. No pooled effect estimate, protocol registration, duplicate independent screening or statistical reanalysis was undertaken. Sample counts across reports were not added because overlap between some research cohorts cannot be excluded.

Evidence was organized as full-text measurement findings in general adult or clinical samples, clinical context from sports cardiology reviews, an explicitly identified abstract-only report in competitive bodybuilders and questions requiring direct testing in resistance-trained adults. These are categories of applicability, not formal certainty ratings. Incomplete full-text access restricts methodological conclusions about the direct athletic evidence.

3 Research results

3.1 Relevance to muscular arms and limits of direct evidence

The full-text sports cardiology review by Schweiger and colleagues highlights the larger upper-arm circumference of strength athletes as a reason to check cuff sizing. An earlier review by Leddy and Izzo also includes appropriate cuff selection within standardized assessment of athletes. Both are secondary clinical sources, and neither constitutes a new cuff-validation experiment in resistance-trained adults [4,5].

Palatini and Frick discuss how arm shape and highly muscular upper arms may complicate self-measurement. This is a clinical and technical rationale for assessing fit, not proof that training status itself predicts error [13]. One directly relevant primary cuff-comparison study in competitive bodybuilders was identified outside the 25-paper full-text evidence set [26].

Fonseca-Reyes et al. studied resting blood pressure in 193 competitive bodybuilders using medium (12 cm) and large (16 cm) adult cuffs. For participants with arm circumference greater than 33 cm, the PubMed abstract reports systolic readings higher by a mean of 8.2 ± 10.6 mmHg and diastolic readings higher by 1.6 ± 7.4 mmHg with the medium cuff compared with the large cuff; a statistically significant difference was reported only for systolic pressure. The abstract also reports that 48 of 144 individuals had systolic pressure of at least 140 mmHg with the medium cuff, compared with 17 of 144 with the large cuff [26]. These figures describe between-cuff differences, not error against an independent reference standard or confirmed hypertension diagnoses. Because the full article was unavailable for this review, its complete methods, possible sources of bias and applicability beyond the recruited competitive bodybuilders were not critically assessed.

Thus, directly relevant athlete observations exist, but their methodological assessment is limited by source access. Full-text comparisons from general adult populations remain valuable for assessing cuff effects, yet their numerical results should not be treated as estimates of measurement error attributable specifically to muscularity [4,6,26].

3.2 Cuff size and automated measurements

In the Cuff(SZ) randomized crossover trial, 195 community-dwelling adults underwent automated measurements with different cuff sizes. Relative to an appropriate cuff, a regular cuff increased mean systolic pressure by 4.8 mmHg in those requiring a large cuff and 19.5 mmHg in those requiring an extra-large cuff. In those requiring a small cuff, it lowered systolic pressure by 3.6 mmHg [6].

The randomized within-person design supports an effect of cuff mismatch on readings with the tested device. Resistance-training status and muscularity were not experimental exposures [6]. The direction of this result is consistent with the abstract-level bodybuilder comparison, but numerical differences across these studies are not interchangeable [26].

A diagnostic-accuracy review by Irving and colleagues included 20 studies with 26 comparisons in adults with obesity. No included study satisfied all QUADAS-2 criteria. When an appropriate upper-arm cuff could not be fitted, wrist measurement appeared preferable to using an incorrectly fitting upper-arm cuff, but the comparison with invasive pressure remained inadequately supported for alternative sites. The authors also noted that BMI or circumference may misclassify muscular individuals as obese [14].

These findings show why a size mismatch must be evaluated within a standardized procedure. The Lancet Commission position statement identifies incorrect cuff size alongside inadequate rest, talking and failure to repeat readings as preventable sources of error. Its recommendations concern observer performance and do not quantify cuff error specifically in resistance-trained adults [15].

3.3 Arm geometry and tissue characteristics

Arm circumference does not completely describe the surface enclosed by the cuff. The review by Palatini and Asmar explains how cylindrical cuffs can fit unevenly on conical arms and why auscultatory bladder-size rules cannot automatically be applied to every oscillometric system. Their conclusions primarily concern obesity and large arms rather than an athletic sample [7].

Bonso and colleagues combined an anatomical study of 142 adults with a 33-person validation subgroup. Circumferences ranged from 22 to 45 cm, and arm shape was described using proximal and distal measurements and arm length. The study directly links geometry assessment with a device-specific validation comparison, although the participants were not recruited as strength athletes [16].

The geometric issue should be assessed individually. An arm enlarged by muscle need not have the same shape or tissue distribution as an arm enlarged predominantly by adiposity. The full-text obesity review explicitly recognizes this limitation of circumference- and BMI-based classification [14].

In 729 adult outpatients, circumference and arm length helped explain conical shape. This clinical anthropometric study proposed bladder dimensions but did not test the accuracy of a newly selected cuff in strength athletes. It therefore informs fit assessment rather than athlete-specific diagnostic accuracy [17].

The technological survey by Mousavi and colleagues describes how device design, measurement technique and body habitus may influence cuff-based estimates. It supports examining the interaction between the measurement system and the individual, but it does not validate a correction for muscle mass. The independent contribution of muscle composition remains a question for empirical testing [11].

3.4 Wide-range cuffs and device validation

The term “wide-range” encompasses different designs. In Bonso and colleagues' 33-person validation subgroup, the conical cuff–device combination met the applied criteria whereas the cylindrical combination did not. Full-text review identified blinded reference observers and sequential same-arm comparisons, as well as manufacturer funding. The result is specific to that configuration and does not establish its accuracy in an independently recruited strength-training cohort [16].

The AAMI/ESH/ISO collaboration statement specifies a common framework for validation, including participant selection, measurement procedures and analysis. A general validation result should be interpreted together with the cuff sizes and circumference distribution actually tested; it does not establish equal performance in every anatomical subgroup [18].

The device-selection review by Brady and colleagues similarly emphasizes validation, available cuff sizes and maintenance. Its comparison of protocols shows why the label “validated” should be accompanied by the underlying method and population. Regulatory marketing status and independent clinical validation should not be treated as equivalent [19].

Historical and contemporary devices may combine different bladder dimensions, cuff materials and proprietary algorithms. Palatini and Frick describe wide-range systems as combinations of cuff design and software rather than interchangeable accessories. Therefore, the result for one monitor–cuff pairing should not be generalized to all cuffs marketed for a broad circumference range [13].

Independent validation lists provide a practical starting point, but the exact model, regional version and intended cuff must be checked. Picone and colleagues explain differences between device lists and why models of similar appearance are not automatically equivalent. This equipment check is relevant to a large muscular arm without constituting an athlete-specific validation [9].

The TRUE Consortium research standards require reporting of cuff bladder dimensions and the circumference ranges for which each cuff is used, together with the measurement protocol and observer training. These details

allow readers to interpret a validation or comparison and should also be reported in future studies of resistance-trained adults [20].

Validation should also be distinguished from correct ongoing use. A recent clinical review by Mihailidou emphasizes that a validated monitor still requires an appropriate cuff, standardized patient preparation and repeated measurements. Its clinical recommendations are a procedural framework, not new evidence that any particular cuff is optimal for muscular arms [21].

Product terminology is a further source of ambiguity. Shahi and colleagues compared 42 validated home monitors from 13 manufacturers and found that size labels and circumference ranges were inconsistent. A mismatch with society category names does not itself prove that a validated oscillometric system is inaccurate. The actionable information is the measured arm circumference together with the specific supported device–cuff range, rather than the word “large” alone [8].

3.5 Circumference measurement and other procedural errors

Cuff selection begins with measuring the arm. Oguaju and colleagues compared anatomical landmarks and standing versus seated circumference measurements in 51 adults. Observer agreement was high and landmark-related differences generally had little impact on cuff selection, although boundary cases could receive different cuffs. The report contains inconsistencies between some numerical summaries, so precise between-position differences are not used here. The practical inference is to use a consistent method and the device's stated range [22].

Cuff orientation can interact with sizing. Bilo and colleagues found that rotating a correctly sized auscultatory cuff did not meaningfully alter readings, whereas some rotated positions increased readings when the cuff was too small. A specifically designed oscillometric cuff was relatively insensitive to rotation in the tested setting. The study received manufacturer support; its findings should remain attached to the tested methods and device [23].

Arm support presents another source of error. In the 133-participant ARMS crossover trial, measurements with the hand on the lap or the arm unsupported at the side were higher than those obtained with the arm supported on a desk. Estimated systolic differences were 3.9 and 6.5 mmHg, respectively. The trial did not test muscularity, but it shows why an apparent cuff effect cannot be interpreted without consistent positioning [24].

A systematic review by Kallioinen and colleagues examined 328 empirical studies covering patient, device, procedural and observer factors. Its broad finding is that several departures from standard technique can alter readings. For a cuff-focused review, this means that comparisons must control the surrounding procedure rather than attribute every discrepancy to arm size [10].

3.6 Comparison of the principal empirical studies

Table 1 summarizes selected empirical reports, distinguishing studies assessed in full text from the bodybuilder comparison available only as an indexed abstract [26]. The studies address cuff size, geometry, positioning or equipment labeling. The bodybuilder report directly concerns the target sporting population, but its complete methods were not assessed. The comparator and access status are listed because disagreement between two noninvasive methods is not automatically error against an independent reference.

Table 1 Selected empirical evidence and applicability to resistance training

Study and population	Comparison and result	Evidence access and applicability
Ishigami et al 2023 [6] 195 adults	Randomized cuff-size crossover. Regular-cuff SBP differences: −3.6 for a required small cuff, +4.8 for large and +19.5 for extra-large.	Full text. Community sample; device-specific comparison, not a muscularity experiment.
Bonso et al 2010 [16] 142 anatomical participants; 33-person validation subgroup	Conical and cylindrical cuffs coupled to the same monitor; the conical configuration met the applied ESH criteria.	Full text. Same-arm reference comparison; no strength-athlete recruitment; manufacturer funding.
Palatini et al 2022 [17] 729 adult outpatients	Circumference and arm length helped explain conicity; proposed bladder dimensions by arm-size group.	Full text. Anatomical analysis, not a validation trial of a new cuff in athletes.
Shahi et al 2023 [8] 42 home devices, 13 manufacturers	Cuff labels and circumference ranges varied between and within manufacturers.	Full text. Descriptive inventory; naming differences do not themselves prove inaccuracy.
Bilo et al 2017 [23] 57 main-study adults; 33 in undercuffing study	Rotation effects depended on cuff sizing and design.	Full text. Technical evidence with manufacturer support; tested configurations only.
Liu et al 2024 [24] 133 adults	Randomized arm-position crossover; lap and unsupported side positions raised SBP by 3.9 and 6.5 relative to desk support.	Full text. Procedural control; not a cuff or muscularity validation.
Fonseca-Reyes et al 2009 [26] 193 competitive bodybuilders	Medium versus large cuffs. At arm circumference >33 cm, medium-cuff SBP was higher by 8.2 ± 10.6 mmHg.	Abstract only. Direct sporting population; full methods not assessed. Between-cuff disagreement does not establish accuracy against an independent reference.

Source: synthesis of the complete cited reports, except Fonseca-Reyes et al. [26], summarized solely from the indexed abstract. BP, blood pressure; SBP, systolic blood pressure; DBP, diastolic blood pressure. Numerical differences are in mmHg unless otherwise stated. Between-cuff differences do not by themselves establish accuracy or confirm hypertension misclassification.

4 Discussion

4.1 Sporting relevance and the direct evidence gap

The retained athlete reviews support explicit attention to cuff selection during cardiovascular assessment of strength athletes. Their value is to identify the clinical setting in which large arms may create a measurement

problem [4,5]. The abstract-reported primary comparison by Fonseca-Reyes et al. provides directly relevant observations in competitive bodybuilders, but does not permit complete appraisal of study methods or demonstrate the frequency of confirmed false hypertension diagnoses [26].

The full-text restriction prevents comprehensive methodological assessment of the athlete-specific comparison described in Section 3.1. Its between-cuff findings complement, but do not replace, validated measurement principles and full-text experiments in other adult populations. Recommendations here consequently emphasize general measurement standards rather than an athlete-specific correction factor [6,12,26].

4.2 Findings transferable from other adult populations

Randomized cuff-size experiments and validation studies support matching the intended cuff to measured circumference and checking the monitor–cuff configuration. Studies of conicity and arm length explain why a size label may not describe fit adequately. These are transferable measurement principles; their numerical effects cannot be assumed to be identical in muscular and predominantly adipose arms [6,17,18].

Population surveys also support maintaining a range of cuff sizes. Jackson and colleagues analyzed arm circumference in 13,038 US adults, but those prevalence estimates do not quantify equipment needs or measurement error among strength athletes [25]. Historical auscultatory findings likewise should not be treated as validation of a modern oscillometric model [7].

4.3 Implications for office and home assessment

Measurement should begin with relaxed mid-arm circumference and the actual cuff's supported range. Preparation, arm support and repeated readings should follow established recommendations; Table 2 summarizes the main checks [2,12]. If an upper-arm cuff cannot be fitted, a validated wrist device can be considered with careful positioning. This is an alternative requiring its own technique, not an interchangeable route to a lower reading [14,21].

Office and home measurements should be technically comparable. The JACC expert panel and the review of self-measurement emphasize validated equipment, suitable cuffs and patient instruction across settings [3,13]. Recording the model, cuff range, arm circumference and measurement arm helps interpret discrepancies. Persistently elevated values require clinical evaluation even after an apparent technical problem has been corrected [1].

Table 2 Measurement problems and practical responses

Problem	Practical response	Supporting evidence
Cuff range does not match the measured arm	Measure relaxed mid-arm circumference; select an intended cuff within the monitor-specific range.	Measurement guidance [2,12]
Cuff closes poorly or fits unevenly	Assess arm length and geometry; use appropriately fitted validated equipment.	Geometry and clinical guidance [17,21]
A universal label is treated as sufficient	Check validation of the exact monitor–cuff combination and the sampled circumference range.	Validation framework [9,18]
Arm unsupported or cuff poorly positioned	Standardize support and heart-level height; follow cuff instructions.	Experimental evidence [23,24]

Problem	Practical response	Supporting evidence
Office and home readings disagree	Check equipment and technique in each setting before clinical interpretation.	Measurement reviews [3,13]

Source: practical synthesis of the cited recommendations and studies. These technical checks are not a validated diagnostic algorithm for strength athletes.

4.4 Appraisal of the strength and transferability of evidence

Table 3 separates design quality from population applicability. The randomized Cuff(SZ) comparison provides strong evidence of a cuff-size effect with the tested device; the conical-cuff report provides a validation comparison and an anatomical rationale. Neither quantifies an independent effect of muscularity, and a group mean difference should not be subtracted from an individual's reading [6,16].

Table 3 Descriptive appraisal of evidence supporting cuff selection

Evidence and access	Design features and limitations	Inference for resistance training
Cuff(SZ) trial [6] Full text	Randomized within-person sequence and repeated reference readings; one monitor system and a community sample.	Supports size-mismatch effects; does not isolate muscularity.
Conical-cuff comparison [16] Full text	Sequential same-arm readings and blinded observers; 33-person validation subgroup; manufacturer funding.	Supports the tested combination under the applied older protocol; no athlete-specific validation.
Adult anthropometry [17] Full text	729 clinical participants from earlier investigations; anatomical rather than diagnostic-accuracy analysis.	Supports assessing geometry; does not validate proposed cuffs in muscular arms.
Cuff-position study [23] Full text	Appropriate sizing and undercuffing examined separately; method- and device-dependent results; manufacturer support.	Supports procedural consistency; does not establish a universal rotation correction.
Obesity diagnostic review [14] Full text	20 studies, 26 comparisons; no study met all QUADAS-2 criteria; heterogeneous references and populations.	Supports avoiding a poorly fitting cuff; alternative-site performance is not established for athletes.

Source: descriptive appraisal of the consulted reports. No numerical risk-of-bias or certainty score was assigned; missing information was not treated as evidence of adequate control.

4.5 Relationship to earlier reviews

Overlap with earlier literature is substantial at the level of measurement technique. Palatini and Asmar discuss cuff dimensions and geometry; Kallioinen and colleagues synthesize procedural sources of inaccuracy; athlete reviews identify measurement concerns; and Mousavi and colleagues examine technological and individual sources of bias [4,7,10,11]. The present question is how directly these findings support conclusions in resistance-trained adults.

Table 4 Scope of selected earlier reviews and the present contribution

Earlier review and access	Principal scope relevant here	Question retained for this review
Palatini and Asmar 2018 [7] Full text	Cuff dimensions, geometry and oscillometric systems, especially large arms.	Which principles have direct validation in resistance-trained adults?
Kallioinen et al 2017 [10] Full text	Empirical sources of inaccuracy in clinical upper-arm measurements.	Which procedural errors must be controlled before attributing a discrepancy to fit?
Schweiger et al 2021 [4] Full text	Hypertension assessment in athletes, including cuff-sizing considerations.	What does measurement evidence establish specifically about muscular arms?
Mousavi et al 2024 [11] Full text	Cuff-based measurement technology, procedural and body-habitus sources of bias.	Which mechanisms remain untested in resistance-trained populations?

Source: comparison of the complete cited reviews. These are selected comparators rather than an exhaustive inventory of all previous reviews. Their inclusion does not establish that the present topic has never been reviewed. The comparison clarifies the contribution and its boundary: this review distinguishes evidence supporting general cuff-selection practice from evidence validating that practice specifically in muscular arms. The abstract-reported bodybuilder study is relevant to the target population, but does not establish accuracy against an independent reference standard on the information available [26]. The full-text experiments support attention to size and configuration, but neither evidence stream validates a single optimal design for all resistance-trained adults. The remaining uncertainty is a reason for direct study rather than a basis for claiming a novel correction method.

4.6 Unresolved questions and priorities for research

The synthesis does not establish whether muscularity independently changes error after circumference, conicity, cuff fit and device are controlled, or whether recreational trainees resemble competitive bodybuilders. The abstract-reported comparison in competitive bodybuilders did not make it possible here to isolate muscularity as an independent source of error [26]. A technological account of body-habitus effects supplies hypotheses, while direct measurement and reference-based comparisons are needed to quantify them [11].

A useful study would recruit women and men across training experience and arm sizes, measure body composition and arm geometry, and compare intended device–cuff combinations in randomized, repeated same-arm sequences. The reference method, observer masking and handling of time trends should be prespecified. Monitor version, cuff dimensions and the circumference distribution should be reported using the universal validation framework and research measurement standards [18,20]. Independent device lists can help identify the exact supported combination [9].

4.7 Strengths and limitations

The review combines a documented narrative search with full-text eligibility and descriptive appraisal. Selection was purposive, screening was not independently duplicated, and supplementary publisher and reference-list

searches were not assigned artificial systematic screening counts. These methods can miss relevant studies and do not support a claim of exhaustive coverage.

Requiring complete articles improved the assessment of the retained methods, results and disclosures but introduced availability bias. One directly relevant bodybuilder study was therefore discussed separately using only its indexed abstract [26]; it could not undergo the same study-level appraisal. Its numerical findings indicate a between-cuff difference in this population, but do not by themselves establish accuracy against an independent reference or the frequency of confirmed misclassification. Review statements and general adult studies cannot replace dedicated athlete-specific validation evidence.

Heterogeneous cuffs, devices and populations preclude a single pooled correction. Manufacturer support in some reports, including the cuff-position study, warrants attention when interpreting product-specific findings [23]. No study identified here demonstrates that improving cuff selection changes long-term cardiovascular outcomes specifically in resistance-trained adults. The conclusions concern measurement quality rather than treatment efficacy.

5 Conclusions

Full-text measurement studies demonstrate that cuff size, geometry and positioning can affect resting blood pressure readings. In addition to relevant athlete reviews, an abstract-reported study in competitive bodybuilders found differences between medium and large cuffs [4,26]. However, the available evidence does not establish a muscularity-specific measurement error against an independent reference standard, a universally optimal cuff or a rate of confirmed diagnostic misclassification [6,16,26].

General adult evidence supports measured circumference, inspection of fit and use of a validated monitor with its intended cuff. Applying these principles to muscular arms is reasonable, while recognizing the lack of direct population-specific validation in the retained full-text evidence [2,18].

An unexpectedly elevated reading should prompt standardized repeat measurement with suitable equipment. A lower value after changing cuffs is not, by itself, proof of accuracy; persistent elevation requires clinical evaluation. Further studies should directly test well-characterized resistance-trained populations rather than assume that all large arms have equivalent measurement properties [1,12].

Disclosure

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During the preparation of this manuscript, the authors employed ChatGPT to enhance the clarity and readability of the text and to support basic data analysis. All AI-assisted content was carefully reviewed and revised by the authors as appropriate, who assume full responsibility for the final content of the publication.

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