REVIEW ARTICLE

Nutritional strategies for elite breakdancers: From street culture to Olympic performance

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ABSTRACT

Breaking (breakdancing) has recently been added to the Olympic program, yet sport-specific evidence to guide nutrition support remains scarce. This narrative review synthesizes literature on the physiological demands of breaking and translates evidence from dance medicine and sport nutrition into a practice-oriented framework for elite and semi-elite breaking athletes. Searches of PubMed, Web of Science, and Google Scholar were conducted from inception to December 2025 using terms related to breaking, dance, energy expenditure, energy availability, hydration, macronutrients, micronutrients, relative energy deficiency in sport (RED-S), and supplementation. Evidence was synthesized qualitatively and integrated with established sport nutrition guidance when breaking-specific data were unavailable. Available reports indicate substantial training volumes and intermittent high-intensity efforts during battles, supporting individualized strategies to optimize energy intake, carbohydrate availability, protein distribution, hydration planning, and monitoring of low energy availability/RED-S risk indicators. Recommendations are presented as practical starting points for coaches, athletes, and medical teams, explicitly distinguishing direct evidence from extrapolation. Future research should quantify breaking-specific energy expenditure, sweat rates, and competition-day constraints to refine guidance and improve performance and health outcomes.

Keywords: Breaking, Applied sport nutrition, Energy availability, Intermittent high-intensity exercise, Competition fuelling, Athlete hydration.

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INTRODUCTION

Breaking (breakdancing) attracted substantial attention during the Paris 2024 Olympic Games, marking a transition from its street origins to the global elite sport stage (Li & Vexler, 2019). Beyond performance, breaking is embedded in cultural practices that support identity, self-expression, and community formation in urban environments (Bakker & Nuijten, 2018; Fasting, Kari & Fjogstad-Langne, Tonje, 2014). From a sport-science perspective, breaking performance relies on repeated high-intensity efforts that integrate strength, power, agility, and endurance, all of which are sensitive to training load, recovery, and nutrition strategies.

Despite the growth of competitive circuits and Olympic inclusion, evidence to guide high-performance support in breaking remains limited. Recent pre-Olympic work suggests that competitive breakers may present anthropometric and somatotype characteristics distinct from other dance modalities (Arundale et al., 2023; Montalbán-Méndez et al., 2023), and one cohort study reported low stature and body mass, low body fat percentage, and a predominantly mesomorphic profile in Italian breakers (Ruscello et al., 2024). While injuries in breaking have been more frequently studied (Arundale et al., 2023; Montalbán-Méndez et al., 2023), comparatively less attention has been paid to nutrition-relevant determinants of performance, including energy expenditure, hydration demands, macronutrient periodization, and risk indicators consistent with low energy availability/RED-S (Ruscello et al., 2024).

Therefore, the aim of this narrative review is to synthesize available evidence on the energetic and nutritional demands of breaking and to provide an evidence-informed, practice-oriented framework to support coaches, athletes, and practitioners. Recommendations are presented as practical starting points and explicitly distinguished between evidence specific to breaking and extrapolations from dance medicine and established sport nutrition guidelines.

METHODS

This study was conducted as a narrative review with a practice-oriented synthesis. A literature search was performed in PubMed, Web of Science, and Google Scholar from inception to December 2025. Search terms combined (i) the sport and athlete descriptors ("*breaking*", "*breakdance*", "*breakdancing*", "*B-boy*", "*B-girl*", "*breaker*", "*battle*") with (ii) nutrition and physiology concepts ("*energy expenditure*", "*energy availability*", "*carbohydrate*", "*protein*", "*hydration*", "*sweat rate*", "*micronutrients*", "*iron*", "*vitamin D*", "*RED-S*", "*relative energy deficiency in sport*", "*supplements*", "*ergogenic aids*"). Searches were adapted to each database using Boolean operators and, when available, truncation.

Eligibility criteria were intentionally broad to capture the limited sport-specific evidence. We included peer-reviewed original studies, reviews, and consensus/guideline documents that reported outcomes relevant to nutritional support in breaking, including energy expenditure or training/competition demands, dietary intake patterns, hydration-related measures, macronutrient strategies, micronutrient status, RED-S/low energy availability indicators, or supplement use. Studies were eligible when they involved elite or semi-elite breaking athletes; when breaking-specific evidence was unavailable, we also considered studies in closely related proxy populations (e.g., hip-hop/street dance or other dance forms) and established sport nutrition guidelines to inform practical recommendations.

Records were screened by title/abstract, then by full text for relevance. Duplicates were removed. The final set comprised 35 sources, which were synthesized qualitatively and organized by thematic domains (physical demands; energy and energy availability; macronutrients; micronutrients/RED-S; hydration; competition-day

strategies; supplements). Recommendations were explicitly labelled as based on breaking-specific evidence versus extrapolated guidance from related literature and established sport nutrition frameworks.

PHYSICAL DEMANDS OF BREAKING ATHLETES

Breaking (breakdancing) is a high-demand dance-sport discipline that integrates acrobatic skills, repeated high-intensity whole-body efforts, and rhythmic motor control. Although the movement vocabulary is diverse, commonly described elements include top rock (upright steps), transitions to the floor (go-downs), footwork/down rock (ground-based locomotor patterns), power moves (rotational skills requiring momentum and technique), and freezes (brief isometric holds in mechanically challenging positions) (Fogarty, 2018). From a sport-science perspective, this profile suggests intermittent bouts of high neuromuscular and metabolic stress, with substantial mechanical loading—features directly relevant to fuelling, hydration, and recovery planning.

Breaking is often practiced within peer-based learning environments (e.g., "*each one teaches one*"), and many athletes train without continuous coaching support, which may contribute to a higher injury burden and inconsistent training periodization (Arundale et al., 2023; Kauther et al., 2009; Tsiouti & Wyon, 2021). Consequently, training organization and load management can vary markedly across athletes and settings.

Empirical descriptions of elite training load remain limited. In a sample of national-squad professional breakers (n = 12), Lindner et al. (2024) reported an average total training volume of 24 ± 10.2 h·week^{-1}, including 9.5 ± 6.9 h·week^{-1} of breaking-specific practice and 9.5 ± 6.5 h·week^{-1} of non-breaking modalities. Non-breaking training was primarily devoted to strength training and full-body workouts, followed by conditioning/flexibility-oriented work (e.g., functional fitness, Pilates, yoga), aerobic/fitness training (e.g., running, cycling, swimming, plyometrics), and recovery-oriented practices (e.g., stretching, foam rolling, massage, sauna) (Lindner et al., 2024). This distribution supports the notion that breaking preparation resembles that of other high-performance sports, combining technical practice with structured strength/conditioning and recovery work.

Training sessions commonly include repeated "*full-out*" rounds performed individually or in small groups, sometimes using timed formats to simulate competitive exchanges (Arundale et al., 2023). Heart-rate monitoring data indicate an intermittent high-intensity profile: in 14 elite breakers, approximately 45% of training time was spent in moderate-to-vigorous intensity zones (Zones 2–3, as defined by the authors), and peak heart rates during intense rounds could exceed values observed during a cycle ergometer test (Arundale et al., 2023). These findings are consistent with substantial acute cardiovascular strain and suggest that carbohydrate availability and between-round recovery strategies may be relevant during high-density training and competition simulations.

Competition is typically organized as head-to-head "*battles*", in which athletes exchange short performance bouts across multiple rounds. Bouts are often ~30–45 s, although longer efforts have been reported depending on event rules and format (Fogarty, 2018; Lindner et al., 2024). Judging integrates technical execution, athleticism, musicality/artistry, and transition fluency, requiring both physical capacity and rapid decision-making under fatigue (Fogarty, 2018). Competitive calendars may include multiple local to international events across the year, implying prolonged seasons with repeated travel, variable schedules, and irregular meal timing—factors that can compromise energy intake and recovery if not proactively managed.

Physiological profiling in related hip-hop disciplines further supports high cardiorespiratory demands. Wyon et al. (2018) compared nine male breakers and nine female "*new style*" dancers and reported that breakers' VO_2peak was higher than values published for several dance forms, and mean heart rate during performance exceeded reports from ballet, contemporary dance, and dance sport. Collectively, available evidence supports classifying breaking as an intermittent high-intensity discipline with meaningful strength/power requirements and non-trivial aerobic demands, reinforcing the need for individualized nutrition strategies across training phases and competition periods.

BUILDING A PRACTICE-ORIENTED NUTRITION FRAMEWORK FOR ELITE BREAKING ATHLETES

As in other high-performance sports, nutrition supports physical and cognitive demands relevant to training quality, competition readiness, recovery, and injury risk management (Challis, 2023; Clarkson & Skrinar, 1988; Sandri, 1993). Breaking athletes often face intermittent high-intensity workloads, dense training volumes, and irregular schedules (including evening events and travel), which can constrain meal timing and recovery opportunities. Collectively, these constraints make nutrition planning a plausible contributor to reducing fatigue, supporting adaptation, and mitigating injury risk, even though breaking-specific evidence remains limited.

Given the current scarcity of studies quantifying dietary intake, energy expenditure, and sweat losses in breaking, the recommendations below are presented as practical starting points. Where breaking-specific data are unavailable, guidance is extrapolated from dance medicine and established sport nutrition consensus documents and should be individualized.

Energy and energy availability

At present, there are no direct measurements establishing energy requirements in breaking athletes. Therefore, a useful organizing construct is energy availability (EA), defined as: EA = (Energy intake − Exercise energy expenditure) / fat-free mass (FFM), typically expressed in kcal·kg FFM^{-1}·day^{-1} (Burke et al., 2021).

In healthy athletes, an EA around ~45 kcal·kg FFM^{-1}·day^{-1} is often cited as a reference point for supporting physiological function, although individual needs vary by sex, training load, and body composition (L. Burke et al., 2021). In dance populations, applied guidance has similarly emphasized maintaining adequate EA during intensive training periods (Challis & Stevens, 2019). Because breaking-specific energy expenditure data are not yet available, practitioners may initially estimate exercise energy expenditure using two components: (i) breaking-specific practice, approximated using MET values from activities with intermittent high-intensity characteristics; and (ii) non-breaking conditioning (e.g., resistance training, aerobic work, flexibility), using MET values specific to those modalities. These estimates, combined with body composition assessment (to obtain FFM) and dietary intake monitoring, can be used to approximate EA and guide iterative adjustments to energy intake across training phases.

Macronutrients

General sport nutrition guidelines recommend daily carbohydrate and protein intakes scaled to training demands and body mass, with fat contributing an appropriate proportion of total energy (L. Burke et al., 2021). In dance medicine guidance, carbohydrate is often emphasized during intensive training and rehearsal periods, with practical ranges commonly 4–8 g·kg^{-1}·day^{-1}, depending on workload (Challis & Stevens, 2019). For breaking—given its intermittent high-intensity profile and repeated "*round*" efforts—carbohydrate intake

may reasonably trend toward the upper end of these practical ranges during high-density training blocks and competition periods, provided gastrointestinal tolerance and total energy intake are adequate.

Protein intake should support repair and adaptation, with emphasis on distributing protein across the day and including a post-exercise feeding, while total fat intake should ensure sufficient energy density and support hormonal and micronutrient absorption (L. Burke et al., 2021). Because studies on macronutrient requirements specific to breaking are lacking, these targets should be individualized based on training load, performance goals, and recovery markers.

Micronutrients and red-s risk

Weight-sensitive aesthetic and performance cultures in dance have been associated with elevated risk of low energy availability and Relative Energy Deficiency in Sport (RED-S), which can compromise bone health, immunity, and performance. In a large dance cohort, Keay et al. (2020) reported substantial proportions of dancers who screened at risk for RED-S. Although breaking differs from other dance forms, prolonged seasons, irregular schedules, and pressures on body composition may similarly increase risk in some athletes. Practical monitoring should prioritize micronutrients commonly implicated under low energy availability, including iron, calcium, and vitamin D, alongside clinical indicators (e.g., fatigue, recurrent injuries, menstrual dysfunction in females). Where feasible, periodic assessment of iron status and vitamin D, together with nutrition counselling, may support both health and performance (L. Burke et al., 2021).

Hydration

Hydration is a modifiable factor that can influence perceived exertion, cognitive function, and performance, and inadequate hydration may contribute to fatigue and elevated injury risk (Challis & Stevens, 2019). Dance guidance notes that fluid losses during intense sessions may be substantial, with reported sweat losses potentially approaching ~2 $L \cdot h^{-1}$ in some high-intensity dance contexts (Challis & Stevens, 2019; Mastin, 2009). However, sweat rates and hydration behaviours have not been quantified in breaking. Therefore, athletes should adopt an individualized plan based on simple field monitoring (e.g., pre/post-session body mass change, urine colour/volume) and adjust fluid and electrolyte intake across environmental conditions and session density. Further research is needed to quantify breaking-specific sweat rates and competition-day hydration constraints to refine recommendations.

COMPETITION- AND TRAINING-DAY NUTRITION STRATEGIES FOR BATTLES (B-BOYS AND B-GIRLS)

Unlike sports with clearly delimited peak and off-season periods, breaking athletes may experience prolonged seasons in which training and competition demands overlap (Montalbán-Méndez et al., 2023). Therefore, nutrition strategies should be feasible year-round and account for constraints such as irregular schedules, late-night events, and travel. Given the limited evidence specific to breaking, the recommendations below are adapted from established athlete and dance-sport guidance and should be individualized, particularly for athletes managing body composition and weight-control goals (ADA & DC, 2016; Sandri, 1993).

Before training or battles

Before exercise, breaking athletes should consume a meal or snack that supports hydration and carbohydrate availability while minimizing gastrointestinal discomfort. Practically, pre-exercise foods are typically low-to-moderate in fat and fibre to facilitate gastric emptying and reduce gastrointestinal symptoms (ADA & DC, 2016; Sousa et al., 2013). A common pre-exercise carbohydrate target is ~1–4 $g \cdot kg^{-1}$ in the 1–

4 h window before prolonged or repeated high-intensity exercise, adjusted to individual tolerance and the planned duration/intensity of the session (L. M. Burke et al., 2006).

Hydration strategies should aim to limit body mass losses (e.g., keeping losses <~2% when possible). Sodium-containing fluids may be useful when sweat losses are high, especially during prolonged sessions or hot environments (L. Burke et al., 2021). As a practical starting point, general guidance recommends consuming approximately 5–7 $mL \cdot kg^{-1}$ of fluid about 4 h before exercise, with additional intake guided by urine output and comfort (L. M. Burke et al., 2006).

During training (long sessions or high-density rounds)

When sessions last ~1.5–3 h, as reported for some professional breakers (Lindner et al., 2024), within-session strategies may focus on replacing fluid losses and, when appropriate, providing carbohydrates to maintain blood glucose and perceived capacity (ADA & DC, 2016). Carbohydrate intakes around ~30–60 $g \cdot h^{-1}$ are commonly suggested for prolonged exercise, with the exact amount depending on session density and gastrointestinal tolerance (ADA & DC, 2016). Fluid intake should be individualized (e.g., guided by pre- and post-session body mass changes). When dehydration is substantial, or sweat losses are high, electrolytes—particularly sodium—may be indicated (L. Burke et al., 2021; L. M. Burke et al., 2006).

After training or battles (recovery)

Post-exercise recovery should prioritize rehydration and the restoration of carbohydrate and protein availability, especially when training or competition continues within the next 24 h. General guidance recommends initiating recovery nutrition soon after exercise and continuing intake at regular intervals when rapid recovery is required. Practical targets in the early recovery period often include carbohydrate provision scaled to body mass and session demands, combined with protein at frequent intervals to support muscle repair and adaptation (ADA & DC, 2016). Rehydration should replace both water and electrolytes lost in sweat. When meaningful dehydration has occurred, ingesting approximately ~150% of the estimated fluid deficit over the subsequent hours has been suggested to fully restore fluid balance (L. M. Burke et al., 2006).

NUTRITION DURING AND AFTER BREAKING BATTLES (EVENT-DAY PRACTICALITIES)

On event days, meal timing should be planned around the expected start time of battles. As a practical approach, a larger meal is typically consumed about ~4 h before performance, whereas a smaller snack may be consumed ~1–2 h prior, depending on individual tolerance. Because battles often occur in informal settings and may finish late at night, athletes should be encouraged to bring portable foods and fluids to avoid prolonged fasting and reduce the risk of gastrointestinal issues from unfamiliar options.

During battles, fluid intake should be prioritized to support cognition, motivation, and motor skill performance. When events are prolonged or include multiple rounds with short recovery windows, carbohydrate provision (e.g., sports drinks or easily digested snacks) may help maintain circulating glucose and perceived capacity (Challis, 2023; Challis & Stevens, 2019; Mastin, 2009).

After battles, recovery nutrition should emphasize carbohydrates to replenish muscle glycogen and protein to support repair, particularly when the next training session occurs the following day (Challis & Stevens, 2019). Because events often end late, carrying ready-to-eat recovery snacks can help athletes meet recovery targets despite limited food availability after competition.

DIETARY SUPPLEMENTS AND ERGOGENIC AIDS

Evidence on dietary supplement use and ergogenic aids in breaking athletes is limited, and no breaking-specific intervention studies were identified. Available survey data from related dance populations suggest that supplement knowledge and use may be variable and, in some contexts, lower than in other sport disciplines (Prus et al., 2019). Among a sample of hip-hop dancers, the most reported products were caffeine and multivitamin/vitamin supplements, whereas fewer participants reported using protein supplements or creatine. In another small sample, most breakdancers reported rarely or never consuming several sports nutrition products (e.g., isotonic drinks, carbohydrate or recovery drinks), although these findings should be interpreted cautiously due to limited sample size and self-report bias (Prus et al., 2019).

From an applied perspective, supplements may be considered only when they address a clearly defined need (e.g., documented micronutrient deficiency, inability to meet macronutrient targets with food, or evidence-based acute performance strategies) and when implemented under professional supervision (Challis & Stevens, 2019). Because restrictive or unbalanced dietary patterns have been reported in some dance settings, a multivitamin/mineral supplement may be considered in selected cases; however, it should not replace food-based strategies, and decisions should ideally be guided by dietary assessment and clinical markers (Challis & Stevens, 2019).

Table 1. Practical nutrition framework for breaking athletes around training and battles.

Timing	Core recommendation (starting point)	Practical food/fluid examples	Evidence base*
Before training/battles	**Carbohydrate:** ~1–4 g·kg^{-1} in the 1–4 h pre-exercise window (adjust to tolerance and session demands). **Hydration:** ~5–7 mL·kg^{-1} ~4 h pre-exercise; consider additional small volumes if urine remains dark/low.	Sports drink (~6% CHO) as tolerated; cereal bar; banana/fruit; dried fruit; bread with jam/honey; water and/or sodium-containing fluids if sweat losses are high.	Guideline-based
During (prolonged sessions / high-density rounds)	**Carbohydrate:** ~30–60 g·h^{-1} when sessions are prolonged or when repeated high-intensity bouts occur with limited recovery. **Fluids:** individualize to sweat losses; aim to limit body mass loss to <~2% when possible; include sodium when sweat losses are high or conditions are hot.	Sports drink; gels/chews (if tolerated); small CHO snacks. Use pre/post body mass change to calibrate fluid needs over time.	Guideline-based / Indirect
After (recovery)	**Carbohydrate + protein:** begin recovery nutrition soon after exercise when rapid recovery is required; continue at regular intervals. **Rehydration:** if meaningful dehydration occurred, ingest ~150% of estimated fluid deficit over subsequent hours to restore fluid balance.	Recovery snack pack: milk or yogurt + fruit; sandwich + milk; cereal + milk; smoothie; water + salty foods or electrolyte drink if sweat losses were high.	Guideline-based

*Notes. (1) Values are practical starting points and should be individualized based on training load, gastrointestinal tolerance, body composition goals, and environmental conditions; (2) Recommendations are not breaking-specific requirements; they are extrapolated from consensus guidance for athletes and from dance medicine resources due to limited breaking-specific evidence; (3) Carbohydrate and hydration ranges reflect the joint position statement on Nutrition and Athletic Performance (ADA & DC, 2016) and sport nutrition guidance (L. Burke et al., 2021); (4) The ~150% fluid deficit guideline is included to support post-exercise rehydration when rapid restoration is needed; (5) Dance-specific carbohydrate guidance (commonly ~4–8 g·kg^{-1}·day^{-1} depending on workload) can be used to contextualize daily planning outside the "around-exercise" windows. *Evidence base: Guideline-based = derived from consensus/position statements for athletes; Indirect = inferred from dance medicine / related populations rather than breaking-specific trials.*

Given the anti-doping context of elite sport, any supplement use should follow a risk-minimization approach, prioritizing third-party tested products and conservative dosing strategies. Overall, the current evidence base does not support sport-specific supplement "*protocols*" for breaking, and future studies should quantify habitual intake patterns, micronutrient status, and the acute effects of commonly used ergogenic aids (e.g., caffeine) under ecologically valid battle formats.

Table 1 summarizes a practice-oriented nutrition framework for training and battle contexts; supplement use should be considered adjunctive and only when supported by assessment and evidence.

CONCLUSIONS AND FUTURE DIRECTIONS

Breaking's recent Olympic debut has accelerated interest in evidence-informed performance support, yet evidence on nutrition specific to breaking remains scarce. The available literature suggests that elite breaking preparation can involve substantial weekly training volumes and intermittent high-intensity demands, supporting the relevance of individualized strategies for energy availability, carbohydrate planning, hydration, and recovery. However, most current recommendations must be extrapolated from dance medicine and general sport nutrition guidance, as there are limited direct measurements in breaking.

A practical implication is the need to strengthen access to qualified sport nutrition support within breaking environments, particularly given indications from dance populations that many athletes obtain nutrition information primarily through informal channels rather than structured professional guidance. Accordingly, practitioners should prioritize food-first strategies, systematic monitoring for low energy availability/RED-S risk indicators, and individualized plans that accommodate late-night events, travel, and variable training density.

Future research should quantify breaking-specific demands and test feasible interventions under ecologically valid "*battle*" formats. Priority directions include: (i) direct assessment of energy expenditure and energy availability across training phases; (ii) measurement of sweat rates and electrolyte losses in typical venues and climates; (iii) characterization of habitual dietary intake patterns and micronutrient status in elite breakers; (iv) prospective surveillance linking nutrition-related markers (e.g., low energy availability indicators) with injury and illness outcomes; and (v) controlled evaluations of commonly used ergogenic aids (e.g., caffeine) using anti-doping–compliant protocols and performance-relevant endpoints.

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CONFLICT OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this manuscript.

AI USE DISCLOSURE

In accordance with current publishing ethics and transparency recommendations, artificial intelligence (AI) tools were used solely to assist with translation and language editing, with the aim of improving clarity and

readability. No AI tools were used in the generation of scientific content, including the study design, data collection, analysis, interpretation of results, or the formulation of conclusions. The authors retain full responsibility for the content of the manuscript and confirm its originality, integrity, and accuracy.

DATA AVAILABILITY

Data supporting the findings of this study are available from the corresponding author upon reasonable request.

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