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Drop Sets – Redefined

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ABSTRACT

Drop setting is a mode of resistance exercise that has been historically defined as an immediate reduction in exercise load after set failure to allow more repetitions to be completed. The purpose of the current paper is to posit a modified conceptualization of drop sets and thus propose definitions for drop sets and two related concepts: "drop weight" sets and "drop length" sets. This modified conceptualization stems from the fact that both the external load and resistance arm of an exercise create the resistive torque that ultimately causes set failure (i.e., resistive torque = external load x resistance arm). Consequently, I propose that drop sets be defined as: "a reduction in the resistive torque of an exercise, which typically occurs immediately after a set is taken to failure or high level of fatigue, that allows more repetitions to be completed." Thus, drop sets can be implemented by reducing either the external load or by shortening the resistance arm between sets. I call the former practice drop weight sets and the latter practice drop length sets. This new definition of drop sets broadens the scope of what a drop set has historically been thought to be, while definitions for drop weight sets and drop length sets are subdivisions of the drop set concept. This re-conceptualization of what a drop set is might enhance communication about resistance exercise and diversify the ways that drop sets are prescribed to increase muscle size and strength.

Keywords: Drop set, Fatigue, Muscle, Nomenclature, Resistance exercise, Strength

RESISTANCE EXERCISE

Resistance exercise is planned and repeated muscle contractions against external resistance or one's body mass (32). Prescriptions of resistance exercise can vary in many ways, including training frequency, volume, intensity (load or resistance), and equipment used. In traditional resistance exercise prescriptions (32), an individual performs a set of repetitions using a given load, rests for 0.5 – 3 minutes, then completes subsequent sets in this manner. However, more "advanced" resistance exercise prescriptions also exist (15, 18). These advanced prescriptions typically involve altering the intensity or volume of exercise within or between sets. Often, these advanced prescriptions are implemented to make an individual's exercise session more challenging, enjoyable, effective, or time-efficient. Drop sets are an example of one these advanced training prescriptions (15, 18).

DROP SETS DEFINED

Multiple definitions of drop sets exist but they are broadly similar (Table 1). For example, Schoenfeld et al. (37) defined drop sets as "taking a set to muscular failure at a given magnitude of load, and then immediately reducing the load and performing as many additional reps as possible"(14). Iversen et al. 2021 (18) defined drop sets as a strategy that "involves performing a traditional set, reducing the load, and then immediately performing another set (or multiple sets)" (11). Thus, a drop set might involve an individual lifting 50 kg on a weight stack machine for as many repetitions as possible (Set 1), then immediately reducing the load to 40 kg and performing as many repetitions as possible (Set 2), then immediately reducing the load to 30 kg and performing as many repetitions as possible (Set 3), and so on. In this example, the only aspect of the exercise that changes between sets is the external load or weight being lifted. Similarly, if an individual is exercising with free weights, they can complete drop sets by quickly grabbing lighter dumbbells between sets or by removing weight plates from a barbell between sets.

BENEFITS OF DROP SETS

Drop sets are prescribed for at least two reasons. First, they are time efficient. Drop sets decrease the duration of the inter-set rest interval and thus reduce the time required to complete exercise sessions

(10, 35). Reduced time spent time exercising is important because perceived lack of time is one of the most reported barriers to exercise participation (3, 4, 7, 13, 16, 24, 26, 42). Depending on the number of exercises performed, drop sets can also constitute an exercise "snack," as a high volume of exercise is completed in a short time (12). Because of the potential for drop sets to overcome perceived lack of time for exercise, some researchers have recommended drop sets as a method to increase participation in resistance exercise in the general population (18, 32).

A second reason why drop sets are prescribed is because of their effectiveness. Gains in muscle size and strength from resistance exercise programs that implement drop sets are equal to or greater than from traditional resistance exercise programs, when both programs are equated for exercise volume (1, 6, 35, 38). Importantly, these gains in muscle size and strength are achieved within exercise sessions that are significantly shorter in duration than exercise sessions in which traditional exercise sets are performed (6, 10, 35, 38).

For these reasons, drop sets warrant consideration in resistance exercise prescriptions. To the extent that future research continues to demonstrate the effectiveness and time efficiency of drop sets, their popularity might grow, and they may be increasingly communicated among athletes, coaches, students, journalists, and the public. Thus, a clear understanding of the drop set concept is becoming increasingly relevant (30, 33, 34).

AIM

In the field of strength and conditioning, there is growing recognition of a need to re-evaluate commonly used nomenclature (9, 17, 19, 21, 22, 27, 29, 31, 41, 43-45). This includes exercise names (19, 27, 29) and words and definitions used in describing muscle contraction types (9) and concepts like muscle strength and power (17, 21, 22, 36, 41, 43-45). In fact, in their review of drop sets, Coleman et al. (6) stated "[t]he method by which [drop sets] are performed is not clearly defined in the current literature nor is it universally agreed upon within the lifting community." Thus, although existing definitions for drop sets are broadly similar, with all definitions characterizing drop sets as an immediate reduction in load between sets (6, 8, 11, 14, 18, 20, 35, 37, 38, 40) (Table 1), such definitions remain open for debate. Here, my aim is to posit a re-conceptualization of drop sets (Fig. 1). I suggest a new definition for drop sets and introduce definitions for two related concepts: "drop weight" sets and "drop length" sets.

DROP SETS – REDEFINED

Resistive torque equals the exercise load or resistance (kg) multiplied by the distance (cm) from the axis of rotation to where the resistance is placed upon the exercise participant (i.e., resistance arm, moment arm, or "moment arm of the resistive force" (25)). Current definitions for drop sets are specific to a reduction in the exercise load between sets and thus do not account for the fact that the resistive torque of the exercise can also be reduced by shortening the resistance arm. Thus, I propose a revised definition of drop sets that accounts for both possibilities, broadening the scope of what a drop set is. This definition is based on the fact that the cause of failure during an exercise set is the temporary inability of the individual to generate enough torque to overcome the resistive torque placed on their body. Thus, I propose that drop sets be redefined as: "a reduction in the resistive torque of an exercise, which typically occurs immediately after a set is taken to failure or high level of fatigue, that allows more repetitions to be completed" (Table 1). Failure refers to "momentary failure" as defined by Steele et al. 2017 (39) as the "[s]et end point when trainees reach the point where despite attempting to do so they cannot complete the concentric portion their current repetition without deviation from the prescribed form of the exercise."

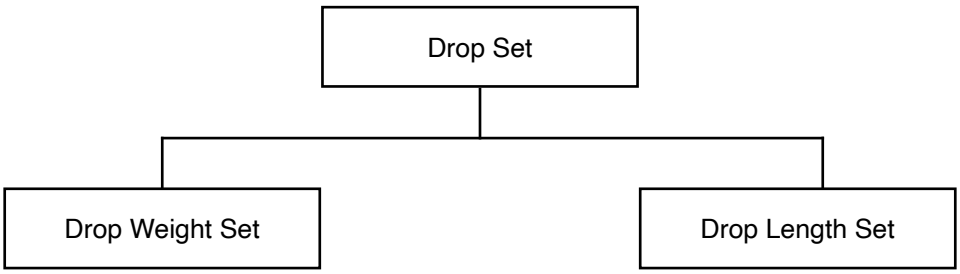

Figure 1. New conceptualization of drop sets.

Table 1. Definitions for the concepts "drop set," "drop weight," and "drop length."

Term	Definition
Schoenfeld et al. (37) - "Drop set"	"taking a set to muscular failure at a given magnitude of load, and then immediately reducing the load and performing as many additional reps as possible."
Goto et al. 2016 (14) - "Drop set"	"an exercise protocol, in which resistance exercise is initially performed with a higher load and then gradually decreased."
Iversen et al. 2021 (18) - "Drop set"	"involves performing a traditional set, reducing the load, and then immediately performing another set (or multiple sets)."
Fischer et al. 2016 (11) - "Drop set"	"the performance of a set to [momentary muscular failure] with a given load before immediately reducing the load and continuing repetitions to subsequent [momentary muscular failure]."
Current paper - "Drop set"	A reduction in the resistive torque of an exercise, which typically occurs immediately after a set is taken to failure or high level of fatigue, that allows more repetitions to be completed.
Current paper - "Drop weight"	A drop set that is accomplished by reducing the external load between exercise sets to allow more repetitions to be completed.
Current paper – "Drop length"	A drop set that is accomplished by reducing the resistance arm between exercise sets to allow more repetitions to be completed.

However, this definition of momentary failure applied to the drop set concept ought not be specific to failure that occurs during the concentric phase of the repetition, because eccentric-only resistance exercise with drop sets is also possible, and momentary failure during eccentric-only exercise would occur during the eccentric phase.

One feature of the newly proposed definition of drop sets is the subclause: "which typically occurs immediately after a set taken to failure or high level of fatigue." The reason for this subclause is because the timing of the "drop" and the level of fatigue that is present prior to the drop do not form the essence of what a drop set is, though they are typically features of drop sets. The critical essence of a drop set is the immediate reduction in resistive torque that makes the exercise easier. The timing of the drop and the level of fatigue present at the time of the drop are secondary, but nevertheless common and important, features of drop sets. For example, if an individual stopped one or two repetitions short of failure, and then reduced the resistive torque to complete more repetitions, would we not still call that a drop set? Moreover, if an individual takes 20 seconds to change the resistive torque between sets rather than one or two seconds, would we still not also call that a drop set? The presence of this information in the subclause of the definition also differs from previous definitions in which "muscular failure" and "performing as many additional reps as possible" are central to the definition (37).

DROP WEIGHT AND DROP LENGTH SETS

Distinct terms can then be used to refer to drop sets that involve reducing the load between sets versus reducing the resistance arm. I propose that these concepts be termed "drop weight" and "drop length," respectively. I propose that drop weight be defined as "a drop set that is accomplished by reducing the external load between exercise sets to allow more repetitions to be completed." I propose that drop length be defined as "a drop set that is accomplished by reducing the resistance arm between exercise sets to allow more repetitions to be completed."

Examples of drop load sets were given earlier, and this type of "dropping" is likely already familiar to many readers. Drop length sets may be less familiar. The lateral step exercise, sometimes called the "resisted side step" (2, 23) or "Monster Walk" (5) (Fig. 2) is an example exercise where drop length sets might be used. With the lateral step exercise, a resistance band is placed around the feet, ankles, knees, or thighs (2, 5, 23). To perform a drop length set, an individual would use the same resistance band for all sets but move the band from a body part that is distal to the axis of rotation (e.g., ankles) to a body part that is more proximal to the axis of rotation (e.g., knees or thighs). For example, Set 1 might involve using a medium band at the ankles and then Set 2 might involve using a medium band at the knees or thighs. By moving the medium band from the ankles to the knees or thighs, the individual reduces the resistive torque and thus makes more repetitions possible. Drop weight sets can also be performed with the lateral step exercise by quickly

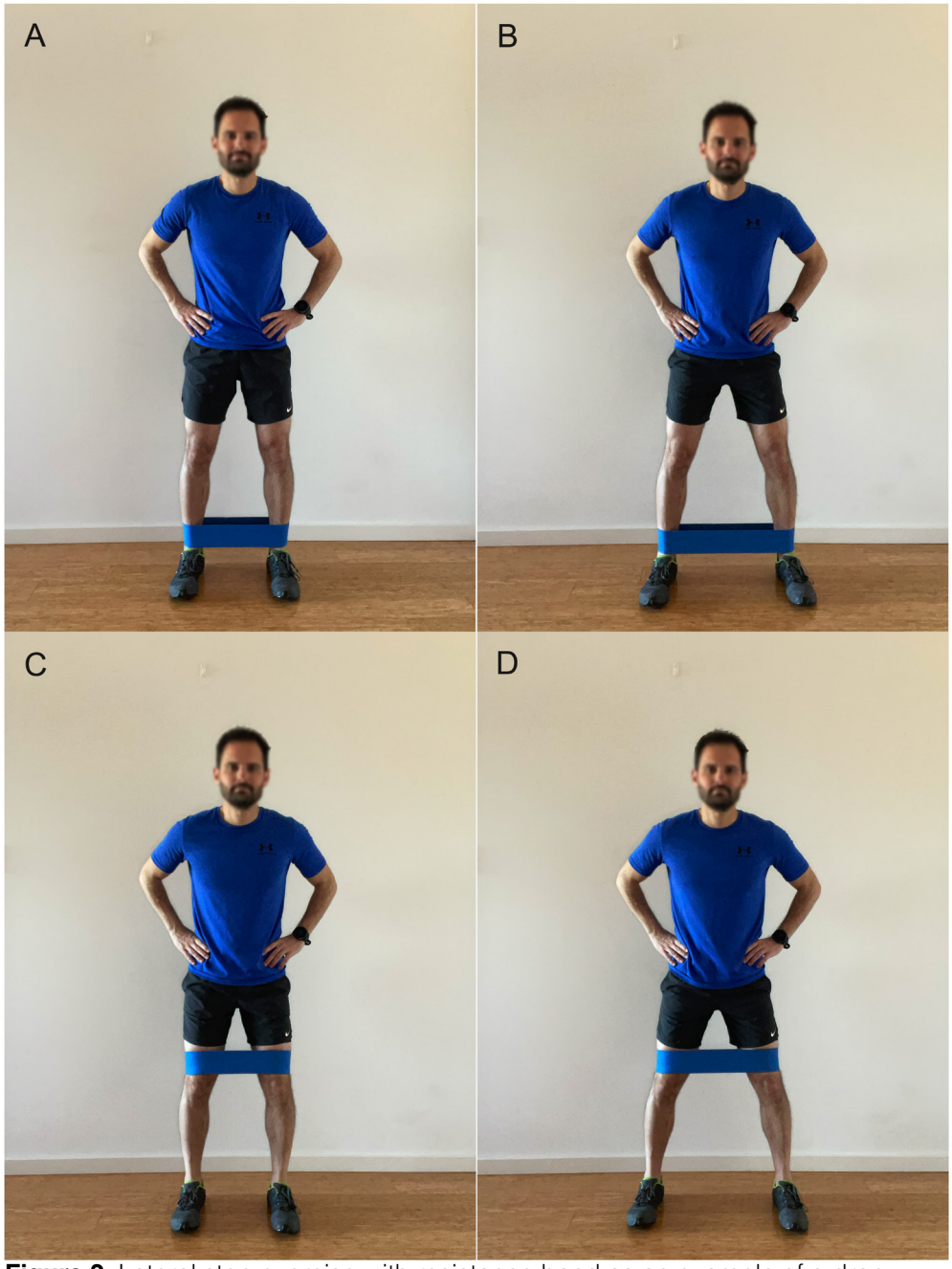

Figure 2. Lateral step exercise with resistance band as an example of a drop length set. A: Start position for repetitions performed with the band at the ankles. B: End position for repetitions performed with the band at the ankles. C: Start position for repetitions performed with the band at the knees or distal thighs. D: End position for repetitions performed with the band at the knees or distal thighs. With this exercise, a drop set can be accomplished by switching to a less-resistant bands after fatigue occurs (i.e., drop weight). Alternatively, as shown in the photographs, a drop set can be accomplished by reducing the length of the resistance arm after fatigue occurs (i.e., drop length). For example, the participant can move the band from the ankles (A, B) to the knees or upper thighs (C, D) between sets.

switching to a band of a lower resistance between sets, while keeping that band at the same body location for all sets. For example, Set 1 might involve a heavy band at the ankles, Set 2 might involve a medium band at the ankles, and Set 3 might involve a light band at the ankles. Thus, the benefit of acknowledging the possibilities of both drop length and drop weight sets is that it gives individuals more options for exercise. For example, if an individual has access to only one exercise band, then a drop load set would not be possible, but a drop length set would be possible.

Shortening the resistance arm is also possible for many other exercises, particularly for exercises that involve positioning a strap or band along the limbs.

For example, the arm lateral raise, hip abduction, and hip extension exercises can all be performed with resistance bands or straps secured at various locations along the limbs. For each of these exercises, the position of the band or strap can be moved proximally between sets to reduce the resistive torque and thus make the exercise easier at a given load or resistance.

An example of a drop length set that involves only the resistance of one's body mass is the push-up. The resistance arm of the push-up can be shortened between sets by changing the axis of rotation from the feet to the knees (i.e., knee push-ups). The abdominal leg lift is another example. Whether performed lying prone on the floor or positioned upright in a dip-leg raise rack, individuals can perform Set 1 with their legs full extended (i.e., leg raises) and then after failure occurs, they shorten the resistance arm for Set 2 by bending the knees to 90 degrees to complete more repetitions in the form of knee raises.

ADDITIONAL CONSIDERATIONS FOR DROP LENGTH SETS

Because drop length sets involve altering the location of where the resistance is applied to the body, this will likely change the muscle activity profile between sets in a way that differs from drop weight sets. For example, with the lateral step exercise, muscle activity of tensor fascia lata, gluteus medius, and gluteus maximus are greater when the resistance band is positioned around the knees or thighs (i.e., shorter resistance arm) than when the resistance band is positioned around the ankles or feet (i.e., longer resistance arm) (5, 23). Also, with an exercise like the lateral step, changes in body posture that do not involve changing where the resistance is applied will also alter the resistance arm, and this is presumably why activity of lower-limb muscles during the lateral step differs depending on whether the exercise is performed from a standing or squatting posture (2). Thus, if a drop length set for a particular exercise changes the mechanics of an exercise in a way that drastically alters the muscle activity profile of that exercise, then perhaps this constitutes a conceptualization of a completely different exercise and a superset (18) rather than a drop length set for a given exercise.

Also, exercise technology is a key factor in determining the extent to which altering the resistance arm is feasible between sets. For example, though some models of the pec deck machine might not make adjusting the point of application of the resistance from the hands to the elbow comfortable or possible, such issues are resolvable with new designs of machines. This is also true for exercises in which a band or strap around a certain part of a limb might cause discomfort and thus be avoided. The history of resistance exercise equipment illustrates that such issues are eventually addressed by inventors (28). Thus, the principle of shortening the resistance arm to reduce the resistive torque applies irrespective of whether technologies currently exist to allow for feasible implementation of drop length sets. Redefining drop sets as a reduction in the resistive torque might motivate future efforts to engineer exercise equipment that allows for both drop weight sets and drop length sets to be performed safely, feasibly, and effectively.

CONCLUSION

The purpose of this paper has been to put forward a revised definition for the drop set concept. Currently, drop sets are defined as an immediate reduction in exercise load after reaching set failure to allow for more repetitions to be completed. This definition does not account for the fact that exercise load is not the only component of resistive torque. Resistive torque can also be reduced between sets by shortening the resistance arm. Thus, I posited the following definition for drop sets: "a reduction in the resistive torque of an exercise, which typically occurs immediately after a set is taken to failure or high level of fatigue, that allows more repetitions to be completed." I then provided definitions for the concepts of "drop weight" sets and "drop length" sets, with the former referring to drop sets that occur via load or weight reduction and the latter referring to drop sets that occur via shortening of the resistance arm. This re-conceptualization of what a drop set is might enhance communication about resistance exercise, and it might cause reflection about the diverse ways that drop sets can be prescribed for increasing muscle size and strength.

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CONFLICTS OF INTEREST

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ETHICAL APPROVAL

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REFERENCES

1. Angleri V, Ugrinowitsch C, and Libardi CA. Crescent pyramid and drop-set systems do not promote greater strength gains, muscle hypertrophy, and changes on muscle architecture compared with traditional resistance training in well-trained men. Eur J Appl Physiol 117: 359-369, 2017.
2. Berry JW, Lee TS, Foley HD, and Lewis CL. Resisted Side Stepping: The Effect of Posture on Hip Abductor Muscle Activation. J Orthop Sports Phys Ther 45: 675-682, 2015.
3. Blake H, Stanulewicz N, and McGill F. Predictors of physical activity and barriers to exercise in nursing and medical students. J Adv Nurs 73: 917-929, 2017.
4. Bowles HR, Morrow JR, Jr., Leonard BL, Hawkins M, and Couzelis PM. The association between physical activity behavior and commonly reported barriers in a worksite population. Res Q Exerc Sport 73: 464-470, 2002.
5. Cambridge ED, Sidorkewicz N, Ikeda DM, and McGill SM. Progressive hip rehabilitation: the effects of resistance band placement on gluteal activation during two common exercises. Clin Biomech 27: 719-724, 2012.
6. Coleman M, Harrison K, Arias R, Johnson E, Grgic J, Orazem J, and Schoenfeld BJ. Muscular adaptations in drop set vs. traditional training: a meta-analysis. Int J Strength Cond 2: 1-11, 2022.
7. Daskapan A, Tuzun EH, and Eker L. Perceived barriers to physical activity in university students. J Sports Sci Med 5: 615-620, 2006.
8. Enes A, Alves RC, Schoenfeld BJ, Oneda G, Perin SC, Trindade TB, Prestes J, and Souza-Junior TP. Rest-pause and drop-set training elicit similar strength and hypertrophy adaptations compared with traditional sets in resistance-trained males. Appl Physiol Nutr Metab 46: 1417-1424, 2021.
9. Faulkner JA. Terminology for contractions of muscles during shortening, while isometric, and during lengthening. J Appl Physiol 95: 455-459, 2003.
10. Fink J, Schoenfeld BJ, Kikuchi N, and Nakazato K. Effects of drop set resistance training on acute stress indicators and long-term muscle hypertrophy and strength. J Sports Med Phys Fitness 58: 597-605, 2018.
11. Fisher JP, Carlson L, and Steele J. The effects of breakdown set resistance training on muscular performance and body composition in young men and women. J Strength Cond Res 30: 1425-1432, 2016.
12. Fyfe JJ, Hamilton DL, and Daly RM. Minimal-dose resistance training for improving muscle mass, strength, and function: a narrative review of current evidence and practical considerations. Sports Med 52: 463-479, 2022.
13. Gómez-López M, Gallegos AG, and Extremera AB. Perceived barriers by university students in the practice of physical activities. J Sports Sci Med 9: 374-381, 2010.
14. Goto M, Nirengi S, Kurosawa Y, Nagano A, and Hamaoka T. Effects of the Drop-set and Reverse Drop-set Methods on the Muscle Activity and Intramuscular Oxygenation of the Triceps Brachii among Trained and Untrained Individuals. J Sports Sci Med 15: 562-568, 2016.
15. Hackett DA, Johnson NA, and Chow CM. Training practices and ergogenic aids used by male bodybuilders. J Strength Cond Res 27: 1609-1617, 2013.
16. Hoare E, Stavreski B, Jennings GL, and Kingwell BA. Exploring motivation and barriers to physical activity among active and inactive Australian adults. Sports 5: E47, 2017.
17. Ide BN, Silvatti AP, Staunton CA, Marocolo M, Oranchuk DJ, and Mota GR. Explosive is not a Term Defined in the International System of Units and Should not be Used to Describe Neuromuscular Performance. International Journal of Strength and Conditioning 3, 2023.
18. Iversen VM, Norum M, Schoenfeld BJ, and Fimland MS. No time to lift? Designing time-efficient training programs for strength and hypertrophy: a narrative review. Sports Med 51: 2079-2095, 2021.
19. Jackson MC, Brown LE, Coburn JW, Judelson DA, and Cullen-Carroll N. Towards standardization of the nomenclature of resistance training exercises. J Strength Cond Res 27: 1441-1449, 2013.
20. Johannsmeyer S, Candow DG, Brahms CM, Michel D, and Zello GA. Effect of creatine supplementation and drop-set resistance training in untrained aging adults. Exp Gerontol 83: 112-119, 2016.
21. Knudson D. Kinesiology's Tower of Babel: advancing the field with consistent nomenclature. Quest 71: 42-50, 2019.
22. Knudson DV. Correcting the use of the term "power" in the strength and conditioning literature. J Strength Cond Res 23: 1902-1908, 2009.
23. Lewis CL, Foley HD, Lee TS, and Berry JW. Hip-Muscle Activity in Men and Women During Resisted Side Stepping With Different Band Positions. J Athl Train 53: 1071-1081, 2018.
24. Mailey EL, Mershon C, Joyce J, and Irwin BC. "Everything else comes first": a mixed-methods analysis of barriers to health behaviors among military spouses. BMC Public Health 18: 1013, 2018.
25. McBride JM. Chapter 2: Biomechanics of resistance exercise, in: Essentials of Strength Training and Conditioning GG Haff, NT Triplett, eds. Champaign, IL: Human Kinetics, 2016, pp 21-22.
26. Moore BY. The attitude of college women toward physical activity as a means of recreation. Res Q 12: 720-725, 1941.
27. Nuzzo JL. Words and patterns that comprise resistance training exercise names. J Strength Cond Res 31: 826-830, 2017.

28. Nuzzo JL. Content analysis of patents for strength training equipment filed in the United States before 1980. J Strength Cond Res 35: 2952-2962, 2021.
29. Nuzzo JL. Inconsistent use of resistance exercise names in research articles: a brief note. J Strength Cond Res 35: 3518-3520, 2021.
30. Nuzzo JL and Nosaka K. Comment on: “Stepwise load reduction training: a new training concept for skeletal muscle and energy systems”. Sports Med 52: 2297-2230, 2022.
31. Nuzzo JL and Nosaka K. Eccentric muscle actions add complexity to an already inconsistent resistance exercise nomenclature. Sports Med Open 9, 2023.
32. Nuzzo JL, Pinto MD, Kirk BJC, and Nosaka K. Resistance Exercise Minimal Dose Strategies for Increasing Muscle Strength in the General Population: an Overview. Sports Med 54: 1139-1162, 2024.
33. Nuzzo JL, Pinto MD, and Nosaka K. Muscle fatigue during maximal eccentric-only, concentric-only, and eccentric-concentric bicep curl exercise with automated drop setting. Scand J Med Sci Sports, 2023.
34. Ozaki H, Abe T, Loenneke JP, and Katamoto S. Stepwise load reduction training: a new training concept for skeletal muscle and energy systems. Sports Med 50: 2075-2081, 2020.
35. Ozaki H, Kubota A, Natsume T, Loenneke JP, Abe T, Machida S, and Naito H. Effects of drop sets with resistance training on increases in muscle CSA, strength, and endurance: a pilot study. J Sports Sci 36: 691-696, 2018.
36. Ruddock AD and Winter EM. Jumping depends on impulse not power. J Sports Sci 34: 584-585, 2016.
37. Schoenfeld BJ and Grgic J. Can drop set training enhance muscle growth? Strength Cond J 40: 95-98, 2018.
38. Sødal LK, Kristiansen E, Larsen S, and van den Tillaar R. Effects of drop sets on skeletal muscle hypertrophy: a systematic review and meta-analysis. Sports Med Open 9: 66, 2023.
39. Steele J, Fisher J, Giessing J, and Gentil P. Clarity in reporting terminology and definitions of set endpoints in resistance training. Muscle Nerve 56: 368-374, 2017.
40. Varović D, Žganjer K, Vuk S, and Schoenfeld BJ. Drop-set training elicits differential increases in non-uniform hypertrophy of the quadriceps in leg extension exercise. Sports 9, 2021.
41. Waller M, Bonder I, and Shim A. Chaos in Strength and Conditioning Terminology. International Journal of Strength and Conditioning, 2023.
42. Watson JC, Ayers SF, Zizzi S, and Naoi A. Student recreation centers: a comparison of users and non-users on psychosocial variables. Recr Sports J 30: 9-19, 2006.
43. Winter EM. Jumping: power or impulse? Med Sci Sports Exerc: 523, 2005.
44. Winter EM. “Critical power”: time to abandon. Med Sci Sports Exerc 43: 552, 2011.
45. Winter EM and Knudson DV. Terms and nomenclature. J Sports Sci 29: 999-1000, 2011.