

*The effects of language and terminology in plyometric training*

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Plyometrics has become a staple training method for many coaches for developing athletic performance in jumping, sprinting and change of direction ability (Markovic *et al*, 2007; Chaabene & Negra, 2017). Due to the dynamic nature of plyometrics, an inconsistency of language and terminology in research has the capability of producing profoundly negative consequences, which could be putting participants/athletes at risk of accident and injury. Researchers and coaches are potentially replicating the work of others but using distinctly different movements. For example, there are large differences between unilateral and bilateral plyometric kinematics (Ebben, Simenz and Jensen, 2008), and an inconsistency of language could lead to individuals using unilateral movements which are in fact meant as bilateral by the primary source, and thus may impact an athlete's development.

Due to its complexity as an open-chain movement method, the language that's used to describe it lacks consistency. The academic and professional coaching world has yet to classify any form of language or terminology for plyometrics, so terms are typically derived from basic animal locomotive verbs i.e., Bunny hops or Kangaroo leaps (Kruger & Pienaar, 2011). Unfortunately, due to the broad descriptive nature of the English language, there is a seamless flow of words that can be used to describe multiple movements that have multiple connotations. Note that the previous examples of locomotive animal verbs are describing how quadruped mammals move, which are also being used within research and in professional coaching settings to describe movements in bipedal humans (Komi, 2008; Lichtwark, 2005).

The power of language within the coaching world is a critical tool for relaying information to athletes and its ability to change the execution, connotation and exercise must not be over-

looked (Richard *et al*, 2012). Coach-athlete interaction is part of everyday practices and a set language and terminology of movements is built upon from the start of the relationship and can develop over years (Ashford *et al*, 2020). The use of words such as 'squat' in the strength and conditioning community is widely used and understood by most. The use of adjectives around the term then provides further triggers for athletes to know movement technicalities and intent, such as 'squat jump' or 'half squat' (Suchomel *et al*, 2018). This kind of language and terminology has not yet been systematized among academics or professionals to explain the hundreds of potential movements that can come from multidirectional plyometrics.

To start building a system for the terminology and language of plyometrics, we must first understand how many basic landing patterns occur during locomotion. The bipedal nature of humans provides four variants of potential movement; i) bilateral (2-foot landings and take-offs), ii) unilateral that's split into unilateral-unipedal (1-foot landing and takeoffs, using only 1 leg), iii) unilateral-bipedal (1-foot landing and takeoffs, alternating 1 leg to the other), and iv) a combination of a unilateral takeoff to a bilateral landing. With this basic structure of movements, variations can be created like the previous 'squat jump' example. The movement example could be a unilateral-unipedal pattern moving laterally, termed, *Lateral Hops*. This example explains the notion of the movement and pattern that should be executed, if need be further adjectives such as 'speed' could be added, providing 'lateral speed hops' (Esformes *et al*, 2010), for further nuance and perception of intent.

With these four movement patterns established, the use of four simple terms can be authorized to be used universally throughout academia and coaching practices. The potential use of a basic movement key with these four movement terms can be implemented to provide clarity for users. The addition of a Kinematic Movement Description (KMD) could be implemented to describe a particular movement by using a written description with images or illustrations. Komi (2008, Chapter 10, p.185) provides examples of anatomical kinograms or chronophotograph sequences through chapter figures that are often designed to show other physiological phenomenon occurring during the movement. Chronophotograph is described by Merriam-Webster (2022) as "a series of photographs of a moving object taken to record and exhibit successive phases of the object's motion". This kind of visual representation, supported with a description of the figure, provides greater context for the reader to disseminate the information and duplicate or use in a manner they perceive will support their athletes/participants. The coaching world has recently taken a step forward with the use of videos to explain movement technicalities and the likelihood of this progressing into academia is becoming more possible with advancements in access to high quality tech (Boyer *et al*, 2009; Sujae *et al*, 2008). This advancement in the academic fields could lead to greater clarity that is needed in open-chain movements such as plyometrics and speed training to help benefit the end user,

which is inevitably built around athlete development.

Language and the misuse of terminology is fundamentally a communication issue that can be remedied with the examples laid out above. A set terminology and language must be established for academia, where for example a unilateral-unipedal movement is always a “hop” no matter the intent, direction and style of movement. With this implemented for the 4 variations of human locomotion, a set movement key and KMD could be made a requirement of all academic and professional education resources with progressive new additions of video examples. These practices leave a smaller margin for error when the recipient is receiving information regarding plyometric training. The potential risk of injury or accident can be reduced with these simple suggestions and the use of plyometric training interventions have the possibility of producing even greater results for athletes in the future.

## References

- Ashford, M., Abraham, A., & Poolton, J. (2020). A communal language for decision making in team invasion sports. *International Sport Coaching Journal*, 8(1), 122-129.
- Boyer, E., Miltenberger, R. G., Batsche, C., Fogel, V., & LeBlanc, L. (2009). Video modeling by experts with video feedback to enhance gymnastics skills.
- Chaabene, H., & Negra, Y. (2017). The effect of plyometric training volume in prepubertal male soccer players' athletic performance. *Int J Sports Physiol Perform*, 12(9), 1205-11.
- Ebben, W. P., Simenz, C., & Jensen, R. L. (2008). Evaluation of plyometric intensity using electromyography. *Journal of Strength and Conditioning Research*. 2008; 22 (3): 861-868.
- Esformes, J. I., Cameron, N., & Bampouras, T. M. (2010). Postactivation potentiation following different modes of exercise. *The Journal of Strength & Conditioning Research*, 24(7), 1911-1916.
- Komi, P. (2008). *Strength and Power in Sport* (3rd ed., p. 185). John Wiley & Sons.
- Kruger, A., & Pienaar, A. E. (2011). The effect of a sport development programme on sprinting and long jump abilities among 10-15 year old black girls from farm schools in the North West Province, South Africa: sport development. *African Journal for Physical Health Education, Recreation and Dance*, 17(2), 357-371.
- Lichtwark, G. A., & Wilson, A. M. (2005). In vivo mechanical properties of the human Achilles tendon during one-legged hopping. *Journal of experimental biology*, 208(24), 4715-4725.
- Markovic, G., Jukic, I., Milanovic, D., & Metikos, D. (2007). Effects of sprint and plyometric training on muscle function and athletic performance. *The Journal of Strength & Conditioning Research*, 21(2), 543-549.
- Merriam-Webster. (2022). Chronophotograph. Merriam-Webster. Retrieved 30 January 2022, from <https://www.merriam-webster.com/medical/chronophotograph>.
- Richards, P., Collins, D., & Mascarenhas, D. R. (2012). Developing rapid high-pressure team decision-making skills. The integration of slow deliberate reflective learning within the competitive performance environment: A case study of elite netball. *Reflective Practice*, 13(3), 407-424.

Suchomel, T. J., Taber, C. B., Sole, C. J., & Stone, M. H. (2018). Force-time differences between ballistic and non-ballistic half-squats. *Sports*, 6(3), 79.

Sujae, I. H., Gon, K. C., & Hin, M. K. T. (2008). Technology enhanced teaching and coaching of complex sport skills—An example of the acro-volley (sepaktakraw) power smash (kuda) and normal relay (sila) serve techniques. *International Journal of Performance Analysis in Sport*, 8(2), 82-93.