Comment on: “No Time to Lift? Designing Time-Efficient Training Programs for Strength and Hypertrophy: A Narrative Review”

Luke Carlson,[1] Dave Smith, [2] and James P. Fisher[3]

[1] Discover Strength, 4450 Excelsior Blvd, Suite 490, St. Louis Park, MN 55416, USA

[2] Department of Sport and Exercise Sciences Manchester Metropolitan University, UK

[3] Faculty of Sport, Health, and Social Sciences, Solent University, Southampton, UK

**Corresponding Author:**

James P. Fisher

Faculty of Sport, Health, and Social Sciences

Solent University

Southampton

UK

James.fisher@solent.ac.uk

Dear Editor,

We read with interest the recent review by Iversen and colleagues titled, *"No Time to Lift? Designing Time-Efficient Training Programs for Strength and Hypertrophy: A Narrative Review"* [1]. We commend the authors on their efforts toward emphasizing the health benefits and importance of resistance training, and for providing these time-efficient recommendations. However, we would like to broaden the application of this article and identify further points worthy of discussion.

Specifically, the authors state, *"This narrative review is intended for those in the general public that have limited time for training, and not for those who are seeking to optimize training adaptations without regard to a time commitment (e.g. athletes)."* We appreciate that Iversen, et al [1] were not addressing an *optimal* approach to strength training for an athletic population. However, we should not assume that simply because athletes are looking to *optimize* adaptations that they have additional time to commit to strength training. Indeed, we should not underestimate the time constraints that exist for athletic populations. In our experience, athletes present the paradox of: (i). having much to gain from resistance training i.e. injury prevention and athletic/performance adaptations [2] as well as the health benefits discussed by Iversen, et al. [1], while (ii). having very little time to engage in resistance training relative to the general population. Our observation may be equally true for professional athletes, collegiate athletes, high school athletes, and high level, adult, amateur athletes. The present authors present coaching and strength training experience with national and international (including Olympic and Paralympic) sports teams and athletes. By experience, fitting in strength training workouts with the demands of other conditioning sessions, competition, travel, meetings, film sessions, technical/skills practice, treatment/therapy, media events, and community events as well as other restraints, such as the union collective bargaining agreement, presents an on-going challenge for athletes and strength and conditioning staff. This schedule only intensifies in collegiate athletics with the addition of academic course load and more frequent travel and competition; sometimes including two to three weekly competitions based on the sport. Further, a high school athlete deals with even more time spent in the classroom and has the added complexities of limited access to strength training facilities compared to professional and collegiate athletes (the weight room may not be open, and a strength coach may not be available when the athlete has a respite from class, studying, practice, games, and part-time jobs). Finally, additional time-constraints to strength training exist in the form of full-time employment, dependents, spouses, and other familial and social relationships, which are not defunct simply by being termed an *athlete*, even an elite one. These are not only important in considering Olympic and Paralympic athletes, but also the weekly regimens of amateur marathon runners or Ironman triathletes, whereby the training volume and time commitment leaves little time for strength training.

Based on the above commitments and stresses, we should recognize that, in contrast to the general public, athletes suffer from burnout, stress fractures and overtraining [3, 4, 5] and (with the exception of bodybuilders, powerlifters and Olympic Weightlifters – where strength training effectively *is* the sport) are primarily dependent

upon the application of strength in performance of a fine motor skill. In this sense, athletic populations might also be suited to a time-efficient, minimum effective training dose to avoid physiological and psychological detriment, and to allocate more time to the application of their muscular strength in the skills required within their sporting endeavor. Indeed, recent data have supported that even well-trained athletes can make increases in muscular strength as a result of a time-efficient training program [6].

The authors also advocate the use of free-weight compared to machine-based resistance exercises, stating that *"…it is easier to simulate real-life movements and sport-specific movements with free weights compared to machines, which usually have limited adaptability of the movement pattern."* Whilst we agree that resistance machines are limited in their movement pattern, typically only moving in plane, we suggest this is more of an advantage. Research has suggested that muscular adaptations might be delayed and even less pronounced when using free-weights compared to resistance machines [7]. This appears to be due to the need to learn the technique of balancing and coordinating free-weight exercises (i.e. the *skill*), compared to a more gross motor skill which requires force in only one fixed plane (i.e. a resistance machine). Further, it is noteworthy that if time efficiency is of primary importance, then the loading and unloading of a barbell can be avoided by using selectorized resistance machines that require only the movement of a pin in a weight stack and the adjustment of a seat position.

In closing, we do not disagree with most of the authors' recommendations [1]. However, we propose that, in view of the inordinate time commitments of athletes, the time efficient, minimal effective dose inspired guidelines that the authors provide for the general population can be extended to include the athlete population too, and the strength coaches who work with them, where appropriate.

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**Conflicts of Interest**

Luke Carlson, Dave Smith and James Fisher declare that they have no conflicts of interest relevant to the content of this letter.

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