Advanced Resistance Training (ART); a point: counterpoint...with myself.

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Firstly, at the time of writing this I want to say how excited I am to be writing a POV (point of view) piece for the first ever REC Resource monthly subscription piece – (now you’re committed to this Luke!). Those of you that have read my research, or seen my conference presentations will know that I’m fascinated with the area of advanced resistance training. Mostly this has been driven from time spent reading anything by Arthur Jones, Dr. Ellington Darden, and Dr. Wayne Westcott, as well as my own ongoing n=1 research study. I’ve called this a point: counterpoint with myself because I have mixed opinions on ART methods and the efficacy of using these techniques, and I’d like to represent a balanced discussion of the pros and cons as well as my own opinion. Here goes...

Point...

I guess I’ll start by clarifying that ART methods are employed with a view to catalysing more favourable adaptations; generally strength and/or hypertrophy, by maximizing recruitment of motor units and muscle fibres, or increasing metabolic stress by increasing inorganic phosphate (Pi) along with hydrogen (H+) and intramuscular acidity (pH). This is a realistic hypothesis as only muscle fibres which have been recruited are likely to grow, and there are reasonable correlations between muscle hypertrophy and changes in Pi, (r = 0.876) and intramuscular pH (r= 0.601) following resistance training (MacDougall, et al. 1999).

So, we could argue that ART is generally performed to increase the intensity of effort of an exercise, generally by using one of the following techniques:

i. **Forced repetitions**: upon reaching MMF having a trainer assist with component parts (e.g. the concentric phase/lifting of the load) of the exercise

ii. **Rest pause training**: the performance of multiple heavy-load repetitions interspersed with brief rest intervals

iii. **Pre-exhaustion training**: the use of isolated exercises immediately prior to compound exercises

iv. **Post-exhaustion training**: the use of isolated exercises immediately following compound exercises

v. **Breakdown set training**: upon reaching MMF immediately reducing the load and performing subsequent repetitions

vi. **Eccentric accentuated training**: the use of either heavy eccentric repetitions (heavier than traditional/concentric loads)

I think it’s important to know what we’re actually trying to achieve by doing this, but it gives us a quantifiable measure of whether we can do this. There is a small, but growing body of research considering ART but it’s fair to say that it is very limited and hasn’t always considered all variables (e.g. strength AND hypertrophy) and hasn’t employed all methods of measuring these variables (e.g. for strength we could use 1-repetition maximum (1RM), isometric or isokinetic dynamometry (computer controlled and measured force) or repetitions to failure with an absolute load; for hypertrophy we could use muscle thickness measured by ultrasound, MRI, or CT scan, or muscle fibre size measured by biopsy). If you have opinions on which of these methods are best (or worst) then this might shape your thoughts of research articles using said methods. (Boy – diplomacy is tough; this is meant to be my POVI) If I consider a few studies which have looked at ART; Forced repetitions (Drinkwater, et al. 2007); Rest Pause (Gießing, et al. 2014); Pre-exhaustion (Fisher, et al. 2014); Breakdown set training (Fisher, et al. 2015) Heavy eccentric training (Fisher, et al. 2016) the
evidence suggests that there are no greater benefits for muscular strength increases for the use of ART compared to training to momentary muscular failure. I should stress that this is TRUE momentary muscular failure – and that in the Gießing, et al. and Fisher, et al. studies this was confirmed through a 1 to 1 (client: trainer) supervision ratio.

A contrasting paper exists by Walker, et al. (2016) who reported more favourable adaptations using eccentric accentuated resistance training compared to traditional training. If I’m honest the evidence is not hugely convincing and I would argue that the participants in the traditional training group are unlikely to have reached true muscular failure but it certainly leaves the door open a little.

Counterpoint...

So arguably, there are no benefits to ART methods? Well...not so fast. As the final study highlighted it might not be so cut and dry, and actually the last study might be one of the most important to consider. Possibly because it might represent how people really train...e.g. not to momentary muscular failure. Without getting in to a lengthy discussion on the subject of supervision, people generally don’t train to muscular failure if training on their own. Arthur Jones when asked if people need supervision to reach muscular failure replied: "Heck no!! If you can place your hand on a table and strike each knuckle firmly with a claw hammer, then you don’t need supervision!" By my experience this is (whilst untested with the claw hammer) a fair analogy. So if people are training alone the use of the above ART methods are likely to be of some use if they help a person reach true muscular failure.

Anything else... well yes... in a moment of honesty, I should clarify that in my workout earlier today I used breakdown-sets on most exercises including overhead press, chest press, and pull-down. And why? Well, for the best reason I’ve ever had; I wanted to! The exercise/health and fitness industry has reimagined itself in a number of ways with the evolution of technology and the addition of everything from Zumba to CrossFit and the reinvention of yoga every few years. All because (for the efficiency and productivity of true, hard resistance training) people like/want change and variety. I think that using ART techniques can provide that variety and retain a mental stimulus in what we do within the realms of logical, evidence-based resistance training. I like breakdown sets because I get to lift heavy, and then I get to really exhaust a muscle to a whole different degree by reducing the weight 2 or 3 times. I like Pre- and Post-exhaustion because they are time efficient and I like forced repetitions because I like to feel like I got more from a workout than I could get on my own – even though I might not have catalysed any greater adaptations.

Summary

To me, as a scientist, the evidence doesn’t support ART methods. If people train to muscular failure then they likely stimulate optimal adaptations with the use of traditional, controlled sets to concentric failure. However, to me as a person, aware that most people don’t train to failure and like variety; ART methods are an important part of motivating people to exercise and pushing them to reach sufficient intensity of effort to optimise adaptations.
References


