Barriers in the Prescription of Cardiovascular Fitness Programs

Appropriate exercise intensity (level of demand/effort placed on the body during an activity) is important to deriving the maximum cardio-protective benefits from aerobic exercise (Aamot, Forbord, Karlsen, & Støylen, 2014; Clark, Lucett, & Sutton, 2012). Without enough eustress, positive physiological adaptations (e.g. improved cardiovascular and respiratory functions), will not occur (Baechle & Earle, 2008). Practical assessment of exercise intensity is a key barrier to cardiovascular fitness program design. Other barriers include client tolerance and motivation.

Selecting the correct intensity for exercise prescription is important, because selection of other acute variables of training such as volume and frequency depend on intensity (Rhea, 2014). While it is common to use some kind of maximal heart rate (HR_{max}) equation (e.g. Karvonen) to approximate and assess intensity levels, such equations have been found to be largely inaccurate (errors exceeding 11 beats/min in some cases) which would be dangerous for some demographics (Roberg & Landwehr, 2002).

Accepted alternatives to HR_{max} calculations are the subjective rate of perceived exertion (RPE) scales (used by 86% of practitioners) such as the Borg scale (and Borg variations CR-10 or 6-20) and the OMNI scale, both variants of the Likert and visual analogue scales (Cabral Dias et al., 2014). The advantage of the OMNI scale is that for children or for those with either comprehension or language difficulties, the OMNI scale is easier to understand/communicate. RPE may also be an internal factor in pacing and self-selected or self-regulated loads (Cabral Dias et al., 2014; Eston, 2012'). The drawback with RPE scales is that for the rating to be accurate, the client must be able to visually see the scale (e.g. poster) which may be inconvenient in some physical activity (PA) situations (Loose et al., 2012). Also, the client's "perception" of the difficulty may be influenced by external factors including the type of activity, nutrition, and climate.

The counting talk test (CTT, a variant of the talk test), requires the client establish a baseline (CTT_{rest}) by counting as high he/she can before taking the next breath (Loose et al., 2012). During exercise the count between breaths is compared to CTT_{rest} and expressed as %CTT. Loose et al. (2012) found CTT consistent across various activities (track walking, stationary cycle, elliptical trainer, and stair stepper) for estimating moderate to vigorous exercise intensities. Difficulty in counting or talking generally indicated that the client was approaching their ventilatory threshold ("sucking air") or "ceiling intensity" (Loose et al., 2012).

Ventilatory (VT) and lactate thresholds are more sensitive to aerobic fitness changes than maximal oxygen consumption (VO_{2max}), and there is a positive relationship between VT and exercise intensity (Quinn & Coons, 2011; Rodriguez-Marroyo, Villa, Garcia-Lopez, & Foster, 2013). Some researchers have proposed that exercise intensity relative to physiologic thresholds is better than using maximal values (Rodriguez-Marroyo et al., 2013). Quinn and Coons (2011) noted that "talking comfortably" correlated to exercising at about 75% of VO_{2max} and 85% of maximal heart rate (or at least the lower end of aerobic intensity prescription); "difficulty in talking" correlated to about 90% of VO_{2max} and 92% of maximal heart rate (or at least the upper end of aerobic intensity prescription).

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Besides the difficulties in making appropriate exercise intensity recommendations, barriers to aerobic exercise prescription adherence are client self-efficacy, tolerance (discomfort nearing VT) and motivation (pushing through the increasing discomfort when approaching VT).

Some clients have a lower tolerance to discomfort especially approaching VT. Catching one's breath can be very unpleasant (more so than muscle soreness). Parfitt, Alrumh, and Rowlands (2012) noted that "feeling good" (higher affective responses to the Feeling Scale) correlated to exercising at lower intensity levels, and lower affective responses indicated exercising at higher intensity levels. A client's self-efficacy in achieving their cardiovascular exercise goals is important to their willingness to experience "discomfort" and adhere to their exercise prescription. Self-efficacy is also an important component of motivation. Utilizing behavioral change strategies, motivational interviewing strategies, identifying mediators of change, and goal-setting would provide the client with a set of tools to persevere and experience the rewards of cardiovascular fitness.

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