

TEXAS DPS SYMPOSIA
COMMENTARY & AFFIRMATION
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It is an honor for me to be asked participate in this symposium. I met Captain Greg Davis approximately 5 years ago when I was reaching out to find protective services groups around the country using the Concept2 rower as a testing and conditioning metric. I have personally used rowers for over 20 years for training and fitness. Captain Davis has now visited Minnesota numerous times to share the benefits of the Texas Department of Public Safety (DPS) fitness and conditioning program with us. He has inspired many of our protective service groups, both law enforcement and fire fighters, to incorporate the C2 testing metric into their fitness wellness initiatives and general conditioning programs. He has helped to transform the attitude of many of these department into one that is proactive and focused on health & injury prevention. I have admired his advocacy for fitness in the law enforcement officer and patrol workplace. Where others have faltered and given in to the status quo, Captain Davis has continued to endorse a higher standard that respects the protective services mission and protects the health of the individual and the public.

To the questions at hand:

It is my opinion that the physical fitness assessments utilized by the Texas DPS including the 500 meter row, 4-minute row, and 2000 meter row test, as well as the Combat Fitness Test (CFT), and Standard PRT, are valid metrics that demonstrate the necessary level of physical capacity and functionality required in the role of a law-enforcement or patrol officer.

It is also my opinion that the utilization of waist circumference metrics, specifically 35 inches (89 cms) for females and 40 inches (102 cms) for males, are consistent with generally accepted scientific standards as they relate to the concept of "command presence". The utilization of percent body fat (%BF) thresholds of up to 18 to 20% for males and 25 to 29% for females, stratified for age and gender, are also valid predictors of physical capacity. The essential level of body fat for males is 3-5% and for females is 8 to 12%. The literature is very compelling in supporting the use of waist circumference as a vital quantifiable metric.^{1 2} Waist circumference is recognized as a better metric for predicting obesity than BMI.^{3 4} Ode and Pivarnik demonstrated how misleading BMI can be not only in athletes, but non-athletes as well.⁵

¹ ACSM's Guidelines for Exercise Testing and Prescription. 10th ed. 2018:73.

² Nye NS, et al. Abdominal Circumference is Superior to Body Mass Index in Estimating Musculoskeletal Injury Risk. MSSE. 2014; 46(10):1951-1959.

³ Booth ML, et al. The relationship between body mass index and waist circumference: implications for estimates of the population prevalence of overweight. Int. Journal of Obesity. 2000;24:1058-61.

⁴ Janssen I, Katzmarzyk PT, Ross R. Waist circumference and not body mass index explains obesity-related health risk. Am J Clin Nutr. 2004; 79(3):379-84.

⁵ Ode JJ, Pivarnik JM, Reeves MJ, Knous JL. Body Mass Index as a predictor of Percent Fat in college Athletes and Nonathletes. MSSE. 2007; 39(3):403-409.

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O'Neill argues that BMI is "at best a noisy measure of fatness, since it does not distinguish fat from muscle, bone and other lean body mass."⁶ He further showed that while BMI and bioelectrical impedance misclassified upwards of 40% of individuals, waist circumference had a combined incidence of false positives and false negatives of only ~3%. While DXA scanning may soon become the criterion method for determining body fat percentage, its use is not yet widespread, whereas waist circumference is obtained quickly, easily, and at minimal cost and provides the necessary correlation of fitness and capacity to perform job tasks.^{7 8}

Use of the Concept2 rower as both a training and testing modality is well established. Cross country skiers and rowers have the highest recorded cardio-respiratory fitness levels. The rowing ergometer has the benefits of utilizing the upper and lower hemispheres of the body as well as incorporating the core/truncal musculature and providing superb cardiopulmonary conditioning. Uniquely, rowing allows one to train specifically at the anaerobic threshold (AT); this is the stage in physical activity (typically ~85% of maximum heart rate) at which an individual crosses over from a sustainable to unsustainable level of exertion. Being able to functionally integrate power, strength, and endurance when maximally stressed physically is essential for a law-enforcement officer. Success or failure in such demanding endeavors may have life or death consequences. As such, the Concept2 rower is more than a training and testing exercise machine, it is a life-support tool that integrates the necessary physical skills to allow the law-enforcement officer to function effectively and successfully in his or her chosen profession. The risk of injury with the rowing machine is extremely low and, as such, it is the modality of choice for many professional and recreational athletes as both a rehabilitation modality and high intensity interval training (HIIT) tool. Traditional training choices such as push-ups, sit-ups, and running have often resulted in strains, sprains, or other musculoskeletal injuries that limit their utility for law enforcement, military, corrections or fire fighters.

Our nation is overwhelmed by the "New Morbidities" that arise from obesity, dietary excess and physical inactivity. This constellation of maladies identified as the "*metabolic syndrome*" clinically presents as chronic systemic inflammation, hypertension, hyperlipidemia, type 2 diabetes, fatty liver disease, kidney disease, renal transplant, amputations, retinopathy, peripheral neuropathy, cognitive decline, bilateral obesity related knee arthritis leading to an epidemic of total knee replacements, and increased rates of premature death. Waist circumference is used as one of the five requisite metrics in the determination and diagnosis of metabolic syndrome. The National Cholesterol Education Program (NCEP) Adult Treatment Panel III (ATP III) was devised to define metabolic syndrome and was updated by the American Heart Association (AHA) and the National Heart Lung & Blood Institute (NHLBI) in 2005. According to the NCEP ATP III definition, metabolic syndrome is present if three or more of the following five criteria are met: *waist circumference over 40 inches (men) or 35 inches (women),*

⁶ O'Neill D. Measuring obesity in the absence of a gold standard. *Economics and Human Biology*. 2015;17:116-128.

⁷ Mattila VM, et al. Body Composition by DEXA and Its Association with Physical Fitness in 140 Conscripts. *MSSE*. 2007;39(12):2242-2247.

⁸ De Koning L, et al. Waist circumference and waist-to-hip ratio as predictors of cardiovascular events: meta-regression analysis of prospective studies. *Eur Heart J*. 2007;28(7):850-6.

blood pressure over 130/85 mmHg, fasting triglyceride (TG) level over 150 mg/dL, fasting high density lipoprotein (HDL) cholesterol level less than 40 mg/dL (men) or 50 mg/dL (women) and fasting blood sugar over 100 mg/dL. We are at a crossroads in the United States at the present time in terms of health and wellness. The Biblical maladies of gluttony and sloth are overwhelming the best efforts of our over burden health care system. At least 3/4 of our current medical burden of non-communicable chronic disease (NCD) is due to inactivity & excessive consumption.

The remedy is to stay healthy by eating moderately and remaining physically active. There is a choice between *spectatorism* and being a *participant*. It is not very expensive or necessarily difficult but it requires a commitment of time, effort and dedication to the mission at hand. My colleague, Dr. Paul Anderson, formally of the Mayo Clinic and I, along with several other colleagues, surveyed 5,000 citizen xc-skiers who participate in our American Birkebeiner ski marathon race in northern Wisconsin every February.^{9 10} This group of individuals has a 3% obesity rate compared with greater than 35% in the general population. These recreational skiers typically exercise 5 hours or more per week. They eat moderately and get 7 hours of sleep on average per night. They are confident in their abilities and have a positive self-concept. They typically eat out once or twice a week, do not smoke, and use alcohol in moderation. Steven Covey paraphrased Viktor Frankl to suggest that *"Between stimulus and response, there is a space. In that space is our power to choose our response. In our response lies our growth and our freedom."*

Nico Pronk PhD is the President & Chief Science Officer for our HealthPartners Institute. He is a noted researcher, on the SPH faculty at Harvard, and co-chair of the Healthy People 2030 initiative of the Department of Health and Human Services (DHHS). He has written extensively about the importance of fitness in the workplace and the demonstrated return an investment that occurs when companies commit to helping their employees remain or become more fit. There is a clear improvement in the bottom line of the organization from a financial standpoint. There is decreased absenteeism, decreased presenteeism, and increased productivity. This is associated with reduced rates of obesity, reduced rates of smoking, and increased levels of fitness. The concepts of the NIOSH Total Worker Health (TWH) initiative provide metrics and inspire this work. The need is to reduce both personal risk factors (PRFs) and occupational risk factors (ORFs) so as to improve the overall health of the individual. Finding ways to incentivize workers to eat less and exercise more is a significant challenge but one that has huge benefit for the individual, the employer, and society. There is a clear relationship between obesity and (1) medication use, (2) chronic medical conditions, and (3) overall healthcare costs that needs to be better defined.

⁹ "Health status and health behaviors among citizen endurance Nordic skiers in the United States. Anderson PJ, Bovard RS, Murad MH, Beebe TJ, Wang Z. BMC Research Notes. (2017) 10:305. DOI 10.1186/s13104-017-2619-4.

¹⁰ "Social Support for Exercise and its Relationship to Health Behaviors and Health Status among Endurance Nordic Skiers". Anderson PJ, Bovard RS, Wang Z, Beebe TJ, Murad MH. British Medical Journal [open] June 2016. [PMID-27338876]

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We know that cardio respiratory fitness is a vital component of health, wellness and longevity. VO2 max, which has long been considered a measure for elite athletes, we now know is in fact a global measure of health & wellness for all individuals. VO2 max measures the efficiency of one's metabolism and oxygen exchange at a cellular level. Preserving this function can help an individual remain healthy well into their later years rather than becoming fragile and invalid. The concept of biological verses chronologic age is important to understand. Jim Fries MD wrote and talked about "compressing the period of morbidity" at the end of life so that people might live independently rather than be confined to nursing homes. This "rectangularization" of the life curve allows one to live fully rather than being dependent on the care of others.

The Scandinavians are very proactive about health and wellness. In Trondheim, Norway Dr. Ulrich Wisloff has created a VO2max calculator that allows one to determine biologic versus chronologic age. This tool can predict one's cardio-respiratory fitness using the markers of age, gender, frequency/ intensity/& duration of exercise, resting heart rate, maximum heart rate, and waist circumference. These are quantifiable metrics, ie outcome measures, that are predictably and consistently associated with health and wellness.

ADDITIONAL CONSIDERATIONS:

- The goal in this process is *Health Centered*. There is no attempt to stigmatize or vilify individuals but rather to emphasize the crucial importance of fitness and health in the performance of one's duty as a protective services personnel. This is a sensitive topic but one that must be addressed honestly and cannot be ignored. The consequences of failure to remain fit as a "ready force" are dire. Whether military, LEO, FF, or Corrections, the need to maintain physical fitness is a crux metric, the *sine qua non*, of all such professions.
- Waist circumference and overall fitness measured by VO2max correlate with the number of medications used, the number of comorbid medical conditions including obstructive sleep apnea (OSA), and overall healthcare costs.
- There is no "*obesity paradox*". BMI is a poor metric that was never meant to be used for individuals but only populations. It is the fact that BMI results in approximately 20% false positives and approximately 20% false negatives that creates this paradoxical but misleading mis-categorization.
- We cannot settle for or accept the notion of "*fit and fat*" as some have asserted. This is a misnomer and oxymoron. The two are not compatible. We must raise the bar and seek optimal health and optimal fitness especially in our protective services personnel.
- The work of a law enforcement officer or fire fighter is a sacred duty and honor. There is a commitment inherent to being a public service defender that is 100% voluntary; this requires adherence to a regimen that allows one to provide service to the community and obligates one to not become a "risk to self or others".

SUMMARY/CONCLUSION:

Those who voluntarily accept the honor of service should also readily accept the responsibility to remain fit and ready to provide that service. It is important to utilize quantifiable standards of performance for individuals in safety sensitive positions. Physical metrics should be age and gender stratified to allow for the inevitable decline (ie sarcopenia, decreased HR & VO2 max) associated with age. Although individuals who stay vigorously active may be able to preserve a high level of function through mid-life into the 50s and 60s with 10-15% decline (from age 35) in optimal performance, time inevitably catches up to all of us.

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