Age-related differences in upper-body muscular endurance amongst male Law Enforcement Officers: a comparison to civilian population norms

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Age-Related Differences in Upper-Body Muscular Endurance amongst male LEO: A comparison to civilian population norms

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Dawes, J., Orr, R., Brandt, B., Conroy, R. & Pope, R. Age differences in push up performance amongst male Law Enforcement Officers, Journal of Australian Strength and Conditioning – Post review




Background

- Police officers are required to perform tasks that can include dynamic movements

(Blacker et al., 2013; Carlton et al., 2013)

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Background

- The push up is commonly employed in tactical populations as a physical conditioning tool (Knapik et al., 2005) and as an outcome measure to determine if a new or modified physical conditioning program is effective (Heinrich, Spencer, Fehl, & Poston, 2012)

http://bloximages.newyork1.vip.townnews.com/thehour.com/content/tncms/assets/v3/editorial/c/cc/cccdaf72-f1ec-59e8-a67a-d3746393b6d7/4fca9e7d97011.preview-300.jpg




Background

- When used as a health measure standards are often based on age norms / historical contexts of reductions in performance associated with aging.

Age (years)	Male (Reps)	Female (Reps)
25 and under	40	21
26-30	35	18
31-35	30	15
36-40	25	10
41-45	20	7
46-50	10	3
51 and over	6	3

Australian Army Basic Fitness Assessment
Push up pass standards




Aims

- Aim:
  - To investigate age-related differences in push-up performance in a physically-active, male law enforcement population and determine whether they mirrored general population norms.

http://www.gannett-cdn.com/-mm-/8ca9f0250d6513048eac44dbfb403e4dd4ab5916/c=234-0-2766-1896&r=x404&c=534x401/local/-/media/Phoenix/2014/06/13/sevpolicehiring1.jpg

Participants

- N=518 ♂ LEO (2 Different LEO US agencies)
  - mean age = 38.99 ±7.50yrs / mean weight = 91.36 ±13.89 kg / mean body fat percentage =21.74 ± 6.0%
- Grouped according to age
  - Group 1: 20-29 yrs [n=66];
  - Group 2: 30-39 yrs [n=177];
  - Group 3: 40-49 yrs [n=234];
  - Group 4: 50-59 yrs [n=41]).




Methods

- Measures:
  - Body weight (lbs) converted to kg
  - Body Composition (Bioelectric impedance)
  - Push ups in 1 minute
- Statistical analysis
  - Pearson's product-moment correlation
  - Forward stepwise linear regression analysis
  - Comparison to published norms (Ratamess, 2012)
  - Alpha set at 0.05 a priori

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Methods

- *Ethical approval*
  - *University of Colorado Colorado Springs Institutional Review Board for human subjects*
  - *Bond University Human Research Ethics Committee*

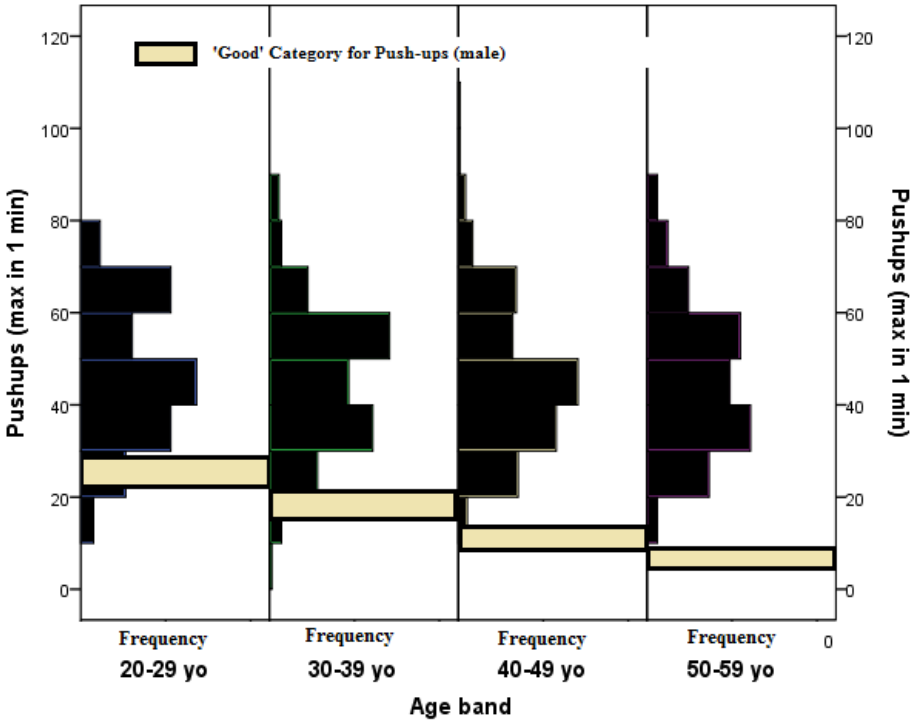



Results

Age Group	All mean±SD	20-29 mean±SD	30-39 mean±SD	40-49 mean±SD	50-59 mean±SD
AGE (yrs)	38.99±7.51	26.59±1.79	34.66±2.90	43.36±2.55	52.76±2.39
WEIGHT (kg)	91.45 ±13.9	87.9 ± 12.86	91.27 ±14.56	93.15±15,26	88.26±11.09
BF (%)	21.78±6.01	17.94±5.94	20.99±6.15	23.32±5.39	24.42±4.42
Push-ups (reps)	44.48±15.47	46.47±14.62	44.66±15.57	43.92±15.74	43.71±15.09




Results



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Results

Final predictive model for push-up performance derived from the forward stepwise linear regression analysis entering %BF, age and body weight.

	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations	
	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial
(Constant)	66.64	3.46		19.23	.000	59.83	73.45		
%BF	-1.45	.11	-.57	-13.66	.000	-1.66	-1.24	-.53	-.54
Age	.23	.09	.11	2.72	.007	.07	.40	-.06	.13

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Discussion

- Contrary to normative data push up performance did not decrease with age in this population of LEO

http://msnbcmedia.msn.com/j/MSNBC/Components/Photo/_new/pb-111021-melb-da-01.photoblog900.jpg




Discussion

- When compared to general population norms, male LEO in each age category demonstrate substantially better push-up performance and do not demonstrate the decline in push up performance with age observed in the general population

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Conclusion / Take Home Message

- Upper-body muscular endurance does not have to decrease with age, within the current age range, if the population is physically active and regularly performs upper body strength exercises
- Population based normative data may not be a suitable comparative sample for tactical populations like law enforcement (rehab/RTW protocols as an e.g)

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