Characterization of Surfing Heart Rate and Activity Across Age Groups

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Abstract

Background: The popularity of surfing has increased over the past several decades to encompass all age groups. The activity profile and heart rate (HR) responses to surfing have previously been characterized in younger but not older surfers. **Purpose:** The purpose of this study was to investigate the impact of aging on the activity profiles and HR responses during surfing. **Methods:** A total of 160 male recreational surfers (18-75 years) were observed during a single surf session. Surf session duration and average HR were measured using HR monitors (Polar FT1 and RCX5). Additionally, a more detailed analysis of HR was performed in a subset of subjects (n=79) in conjunction with evaluation of activity in the water, which was recorded using a video camera (Canon HD). HR responses from the RCX5 HR monitor and activity data from the video camera were synchronized and assessed in 5-second intervals during data analysis. One-way Analysis of Variance (ANOVA) was used to determine differences between age groups for surf duration time. Pearson's correlation coefficient (r) determined relationships between two variables. Significance was set at an α=0.01 due to the large number of correlations tested. **Results:** There were no significant differences between age groups for total time spent in a single surf session (18-29: 66.7±27.0, 30-39: 67.2±29.7, 40-49: 61.9±27.3, 50-59: 66.0±28.0, 60-69: 71.0±33.2min). Similarly, percent time spent in the different surfing activities was not correlated with age (paddling: r=-0.205 p=0.07, stationary: r=0.21 p=0.064, wave riding: r=-0.263 p=0.019, miscellaneous r=0.015 p=0.898). Average HR intensity was increased in older subjects (r=0.389 p<0.001), with significant increases occurring during paddling (r=0.392 p<0.001), stationary (r=0.392 p<0.001), and wave riding stages (r=0.410, p<0.001). **Conclusion:** The results from the current investigation suggest that aging has little impact on the time spent in the various surfing activities, but does significantly increase HR responses during paddling, stationary, and wave riding stages of surfing.

Background

- Surfing has increased in popularity over the past several decades across all age groups, with the median age of recreational surfers in 2011 being 34 (Wagner 2011).
- Previous studies investigated activity and heart rate during surfing in professional surfers (Mendez-Villanueva 2006, Farley 2012), a small subset of the surfing population.
- Less is known about the activity and heart rate profiles of recreational surfers, especially those in older age groups (Meir 1991, Barlow 2014).

Purpose

The purpose of this study was to investigate the impact of aging on the activity profiles and HR responses during surfing in recreational surfers.

Methods

Subjects:
- 160 male recreational surfers age 18-75 were recruited from beaches in Southern California.
- Subjects reported their health and surfing histories after giving informed consent.

Protocol:
- Surf session duration and average HR were measured for all subjects using HR monitors (Polar FT1 and RCX5) during a single surf session
- A subset of subjects (n=79) was videotaped (Canon HD) and activity was later classified into one of four stages: paddling, stationary, wave riding, or miscellaneous.
- HR responses and activity data were synchronized and analyzed in 5-second intervals.

Statistical Analysis:
- One-way Analysis of Variance (ANOVA) was used to determine differences among age groups.
- Pearson's correlation coefficient (r) determined relationships between two variables.
- Significance was set at an α=0.01 due to the large number of correlations tested.

Results

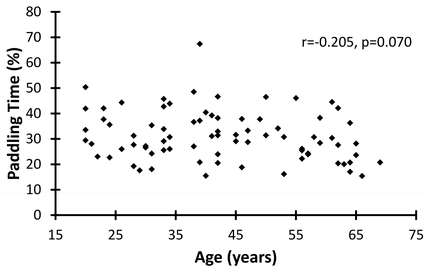

Figure 1: Percent time spent paddling vs. age.

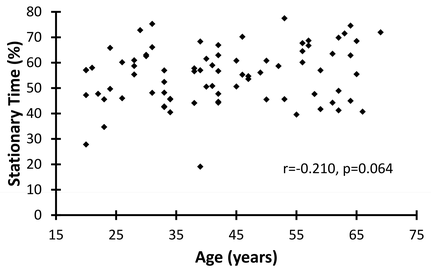

Figure 2: Percent time spent stationary vs. age.

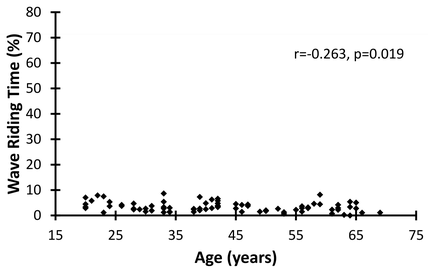

Figure 3: Percent time spent wave riding vs. age.

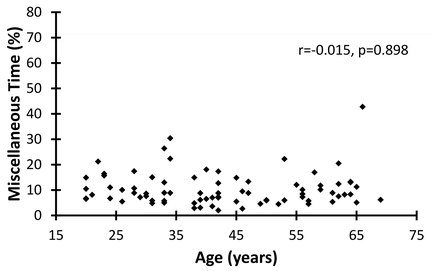

Figure 4: Percent time spent in miscellaneous activities vs. age.

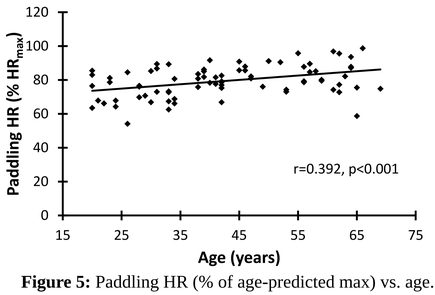

Figure 5: Paddling HR (% of age-predicted max) vs. age.

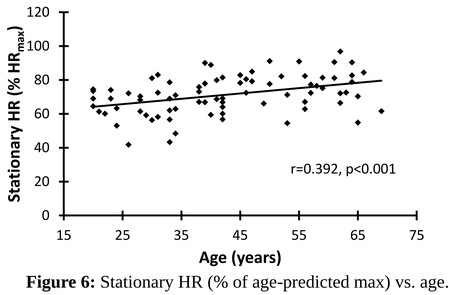

Figure 6: Stationary HR (% of age-predicted max) vs. age.

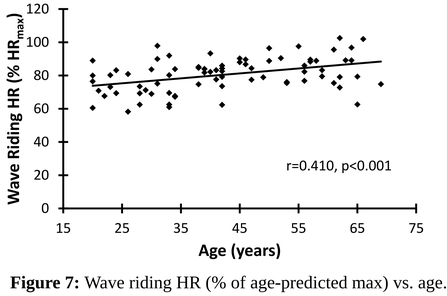

Figure 7: Wave riding HR (% of age-predicted max) vs. age.

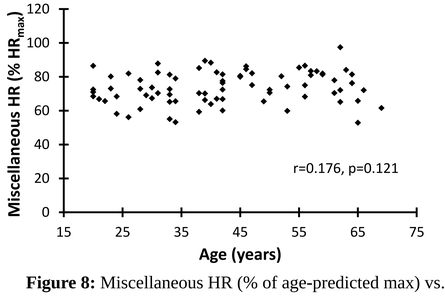

Figure 8: Miscellaneous HR (% of age-predicted max) vs. age.

Subject Characteristics

Subject Age Group	n	Age	Height (m)	Weight (kg)	Surfing Experience (years)	Surfing Frequency (hr/wk)
18-29	34	23.3±3.6	1.79±0.10	74.5±7.6	9.7±5.9	9.3±4.4
30-39	37	34.8±3.0	1.80±0.08	80.8±10.8	17.0±7.9	9.7±7.6
40-49	31	43.6±2.7	1.79±0.08	80.6±10.9	25.1±9.4	8.2±5.9
50-59	29	54.7±3.0	1.75±0.10	84.0±20.4	31.7±13.4	8.1±4.3
60-75	29	65.3±3.6	1.77±0.08	81.7±10.4	36.1±17.7	6.8±2.9
Total	160	43.2±15.0	1.78±0.09	80.1±12.8	23.0±14.7	8.5±5.4

Table 1. Summary of subject characteristics expressed in mean ± SD.

Conclusions

- There were no significant differences between age groups for total time spent in a single surf session (F=0.360, p=0.837).
- Percent time spent in the different surfing activities was not correlated with age (paddling: r=-0.205, p=0.07; stationary: r=0.21, p=0.064; wave riding: r=-0.263, p=0.019; miscellaneous r=0.015, p=0.898) (Figures 1-4).
- Average HR (expressed as a percent of age-predicted max) for the entire surf session increased in older subjects (r=0.389 p<0.001)
- HR (expressed as a percent of age-predicted max) significantly increased in older subjects while paddling (r=0.392 p<0.001), stationary (r=0.392 p<0.001), and wave riding (r=0.410, p<0.001) (Figures 5-8).
- The results from the current investigation suggest that aging has little impact on the time spent in the various surfing activities, but does significantly increase HR responses during paddling, stationary, and wave riding stages of surfing.

References

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