



PREVALENCE OF CARDIOMEGALY AND LEFT VENTRICULAR HYPERTROPHY IN SCUBA DIVING AND TRAFFIC ACCIDENT VICTIMS

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INTRODUCTION

- ❖ Left ventricular hypertrophy (LVH) is an independent predictor of SCD and may be found in asymptomatic subjects.
- ❖ We hypothesized that diving may increase a propensity of LVH for arrhythmia and SCD and thus the prevalence of LVH may be greater among scuba divers than among traffic fatalities.

MATERIALS AND METHODS

- ❖ We compared autopsy data for 100 scuba fatalities with 178 traffic fatalities.
- ❖ Extracted data contained information on age, sex, height (H), body mass (BMkg), heart mass (HM), left ventricular wall thickness (LVWT), inter-ventricular wall thickness (IVWT), and degree of coronary artery stenosis.
- ❖ Calculated values:
 - BMI=BM(kg)/[H(cm)]²
 - BSA (m²) = 0.007184 x [H(cm)]^{0.725} x [BM(kg)]^{0.425}
 - HM%BM – [HM(kg)/BM(kg)]*100
 - rHMBM –HM (g)/ BM (kg)
 - rHMBSA = HM(g)/BSA(m²)
 - rHMBMI = HM(g)/BMI
 - rHMH = HM(g)/H(m)

- ❖ A case was classified as LVH if the LVWT was > 15 mm.
- ❖ Log risk models were used to compare HM and LVWT in two groups. The prevalence of LVH was compared using Pearson’s test.

RESULTS

Table 1. Characteristics of 100 Scuba Fatalities and 178 Traffic fatalities

	Scuba Fatalities	Traffic Fatalities	T-test p-value
N	100	178	
Age	54.1 ±7.1	54.8 ±8.3	0.48
Body mass, kg (SD)	91.2±18.4	89.6±20.2	0.31
Height (cm)	176.1±9.7	170±13	< 0.0001
Male%	84	63	0.0002 (chi-sq test)
BMI	29.78 ±5.7	31.14±7.7	0.13
HM (g)	423±100	387±87	R =1.11 (1.05, 1.17)
HM%BM	0.46±0.08	0.44±0.08	<0.024
rHMBM	4.6±0.9	4.4±0.9	0.136
rHMBSA	202±30	193±34	0.035
rHMBMI	14.5±3.1	12.8±2.8	<0.0001
rHMH	239±42	228±48	0.046
Severe CAD (%)	29	18	0.015

Heart Mass

- ❖ The mean heart mass was 428.3±100 for divers and 387± 87 for controls.
- ❖ The heart mass correlated best with body surface area and was similar for both groups (R² = 0.44). The correlation with the body mass (R² = 0.41) was better in TF (0.44) than in SF (0.37) group.
- ❖ Correlation of heart mass with body surface area and body weight was weaker for females regardless of the group.
- ❖ The crude HM ratio for scuba fatalities vs. controls was 1.11 (1.05, 1.17). When controlled for sex, age, and body mass the final model given by Formula 1 below, provided the best fit and the ratio was 1.06 (1.01, 1.09).

Formula 1
 $Ln(HMg) = \alpha + \beta_1(Group) + \beta_2(sex) + \beta_3(Age) + \beta_4(BMkg) + error$

Figure 2. Mean Heart Mass (g)

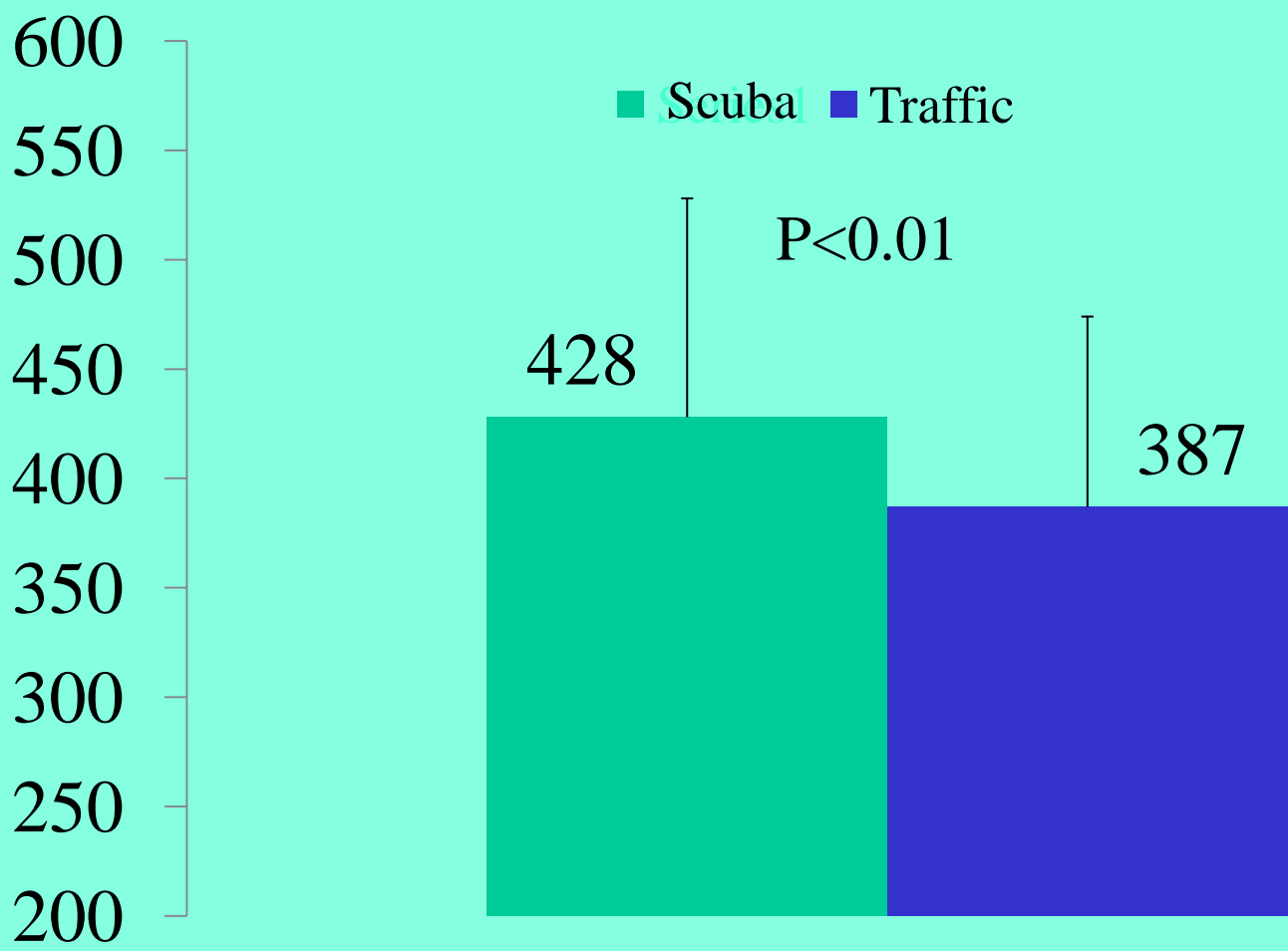
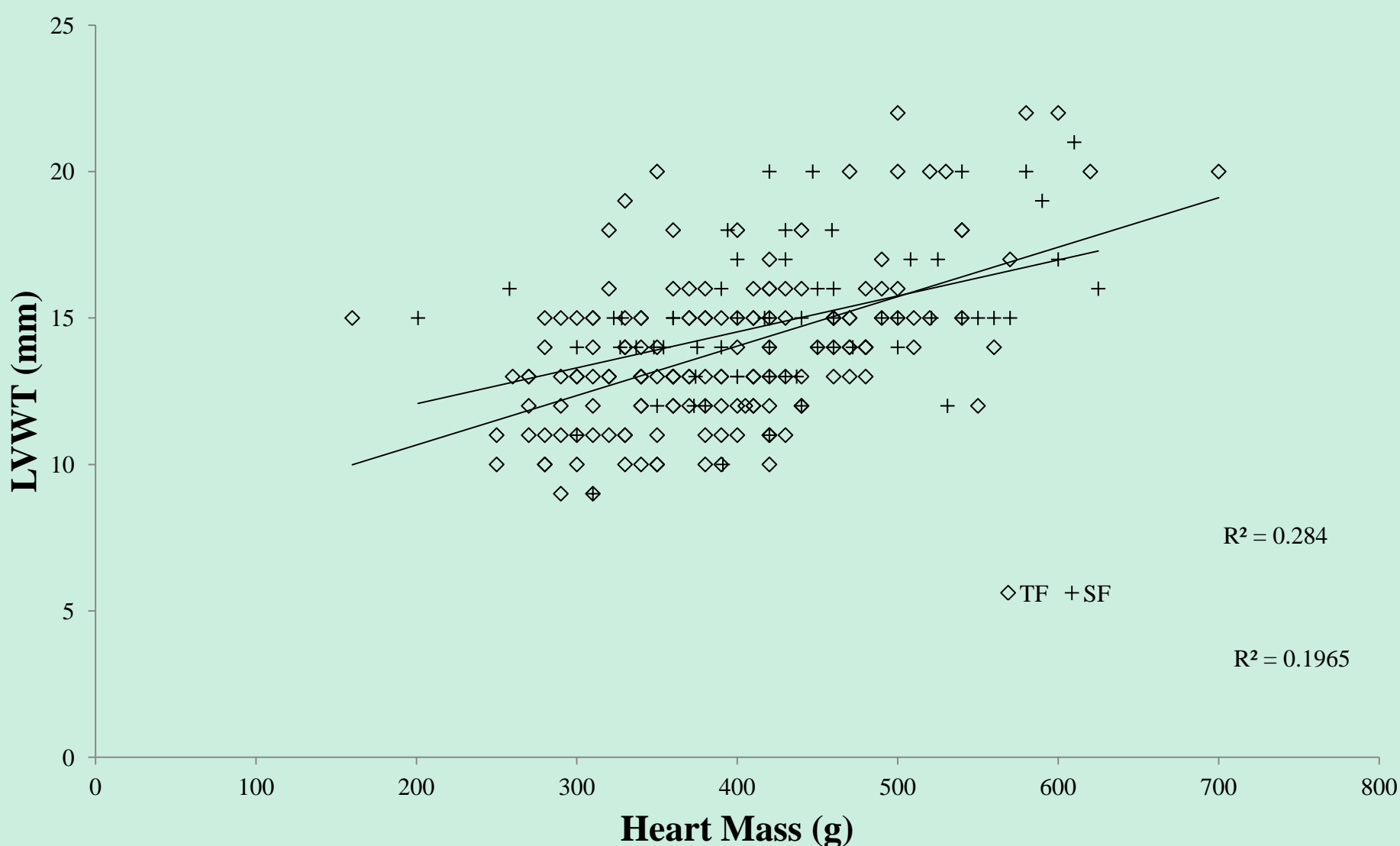


Figure 1. Correlation of LVWT with Heart Mass



Left Ventricular Wall Thickness

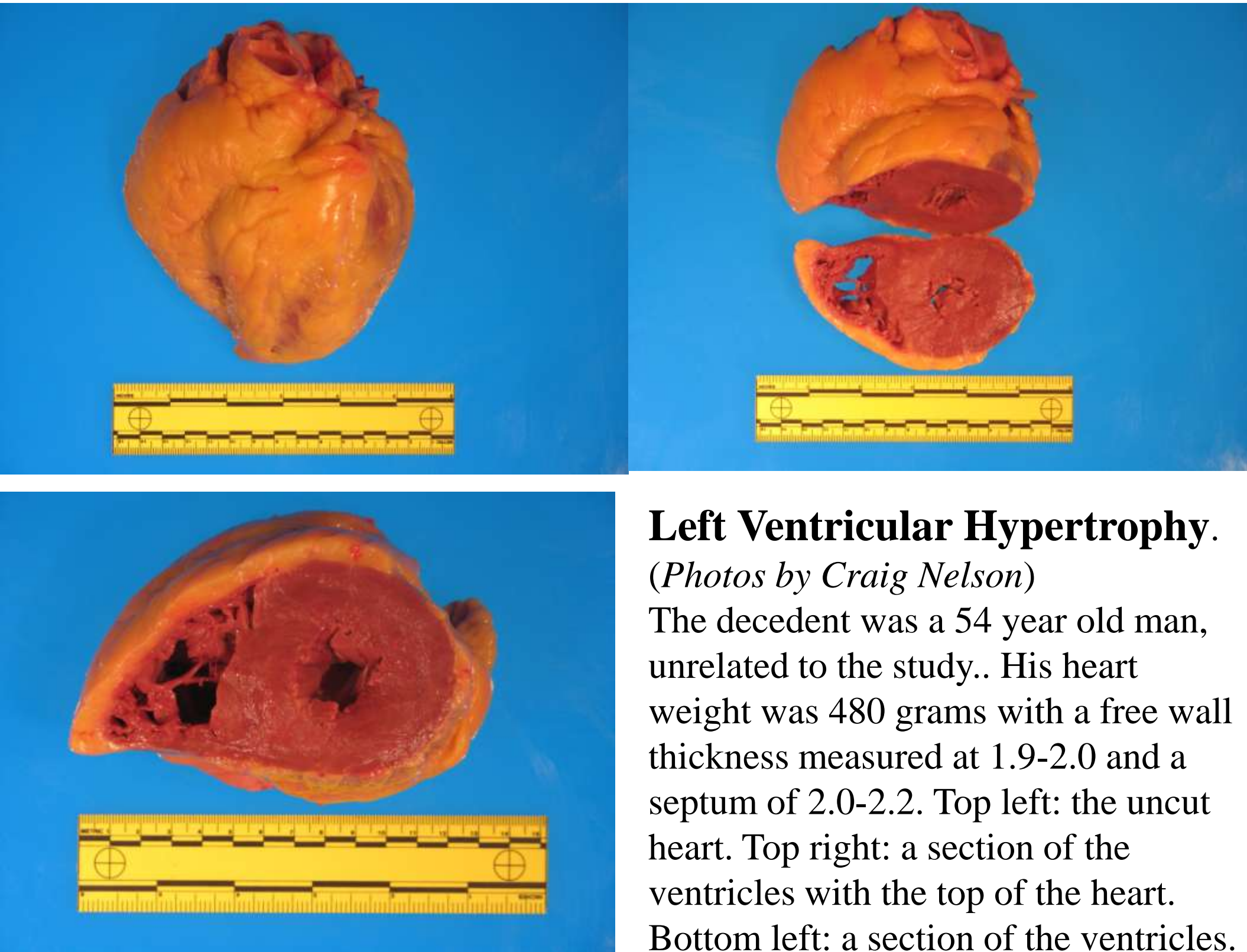
- ❖ The LVWT was available in 67% SF and 88% controls. The mean LVWT was 15±3.5 for divers and 14±2.7 for controls (p=0.0017).
- ❖ The LVWT correlated with the heart mass and was better in TF (R² = 0.2840) than in SF (R² = 0.1965) as shown in Figure 1, but did not correlate with indexed heart mass measures (HM%BM, rHMBM, rHMBSA, rHMBMI).
- ❖ The LVWT in females did not correlate with heart mass or with its indexed measures.

The Prevalence of LVH

The prevalence of LVH (LVWT > 15 mm) in cases was 31% vs. 20% in controls (p=0.042). The data is shown in Table 2.

Table 2. Frequency of LVH

	LVWT > 1.5 cm		
Group	Yes	No	Missing LVWT
Scuba Fatalities	21	46	33
Traffic fatalities	32	124	22



Left Ventricular Hypertrophy.

(Photos by Craig Nelson)

The decedent was a 54 year old man, unrelated to the study.. His heart weight was 480 grams with a free wall thickness measured at 1.9-2.0 and a septum of 2.0-2.2. Top left: the uncut heart. Top right: a section of the ventricles with the top of the heart. Bottom left: a section of the ventricles.

CONCLUSIONS

- ❖ Heart mass and left ventricular wall thickness measured at autopsy were greater in scuba related deaths than in traffic fatalities.
- ❖ This may indicate that diving increases the propensity for arrhythmia in subjects with left ventricular hypertrophy.
- ❖ Better autopsy data are needed to corroborate or disprove these findings.