

ELEM STATS

Assignment 1

3/15/05

Background

- 507 observations on 27 variables
- Sample: 247 men and 260 women from
 - San Jose State University
 - U.S. Naval Postgraduate School in Monterey (CA)
 - CA health & fitness clubs
- Body dimensions from were taken and recorded.
- Summary statistics and graphical analyses from a selection of these observations are detailed below.

Summary Statistics

AGE (yrs)	All	Male	Female
LQ	23	24	22
Median	27	29	26
Minimum	18	18	18
Maximum	67	65	67
UQ	36	37	34
Mean	30	32	29
Standard Deviation	9.61	10.15	8.85

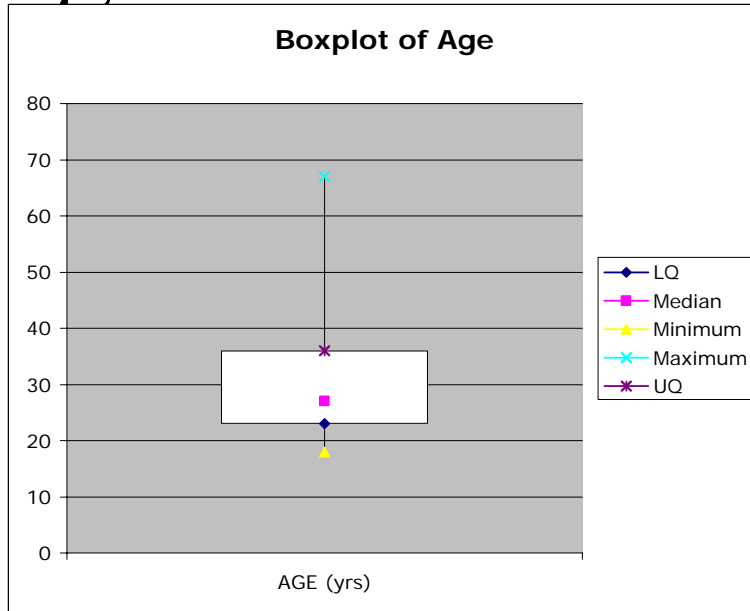
WEIGHT (kg)	All	Male	Female
LQ	58.4	71.0	54.5
Median	68.2	77.3	59.0
Minimum	42.0	53.9	42.0
Maximum	116.4	116.4	105.2
UQ	78.9	85.5	65.6
Mean	69.1	78.1	60.6
Standard Deviation	13.3	10.5	9.6

HEIGHT (cm)	All	Male	Female
LQ	163.8	172.9	160.0
Median	170.3	177.8	164.5
Minimum	147.2	157.2	147.2
Maximum	198.1	198.1	182.9
UQ	177.8	182.7	169.5
Mean	171.1	177.7	164.9
Standard Deviation	9.4	7.2	6.5

CHEST GIRTH (cm)	All	Male	Female
LQ	85.3	96.0	82.0
Median	91.6	101.0	85.5
Minimum	72.6	79.3	72.6
Maximum	118.7	118.7	109.0
UQ	101.2	106.1	89.5
Mean	93.3	101.0	86.1
Standard Deviation	10.0	7.2	6.2

This is a summary of some variables recorded from the observational study, some of which have been included in graphs in the following pages.

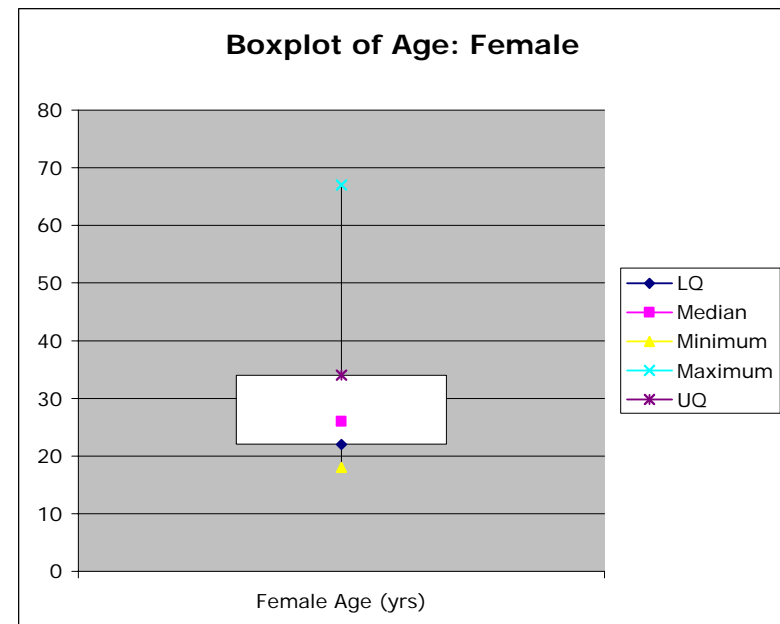
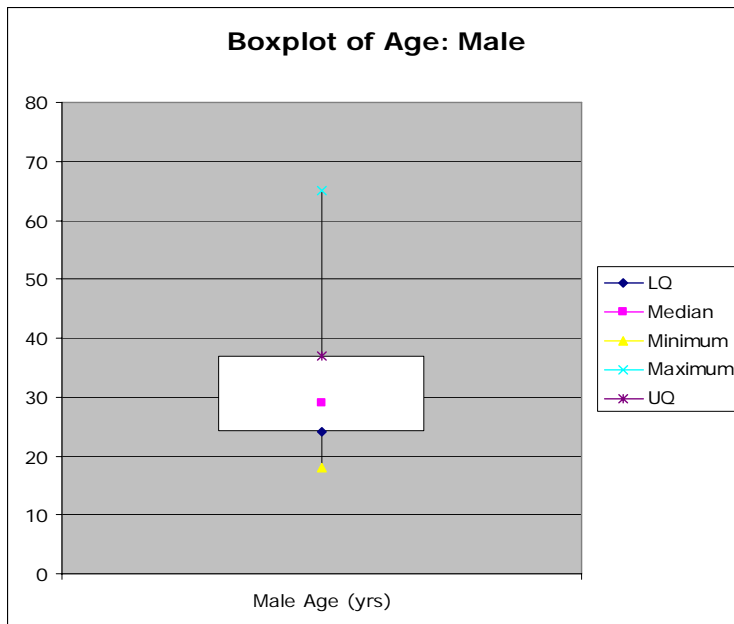
Age



The median age for the entire sample is 27 years old. The youngest is 18 years old and the oldest is 67 years old.

There are differences in age sample between the male and female groups. In general, the male groups are slightly older than the females as indicated by the Median, Lower Quartile (QL), and Upper Quartile (UQ). For example, the median age for males is 29 compared to 26 among the female subjects. The QL's are 24 and 22; and the UQ's are 37 and 34 for males and females respectively.

However, the oldest person in the sample is 67-year old female followed by a 65-year old male.

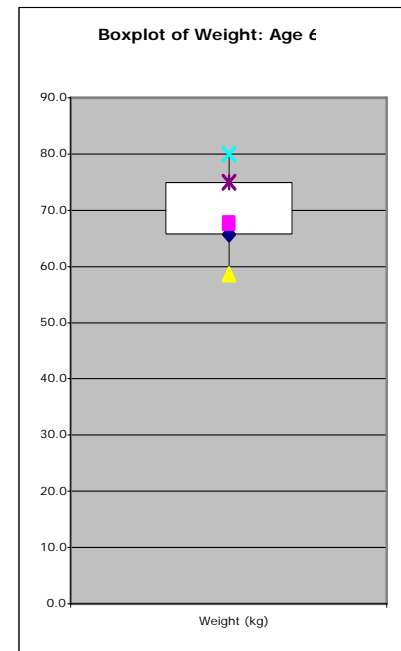
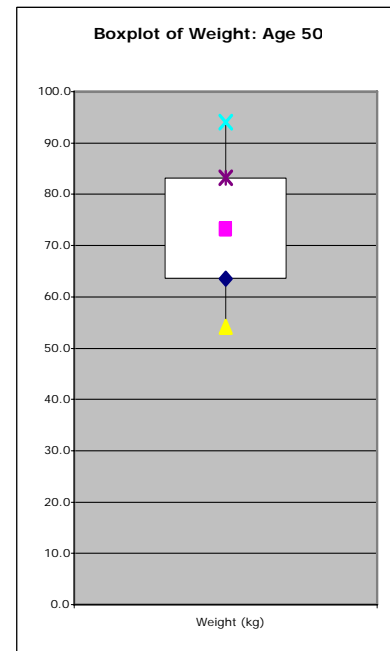
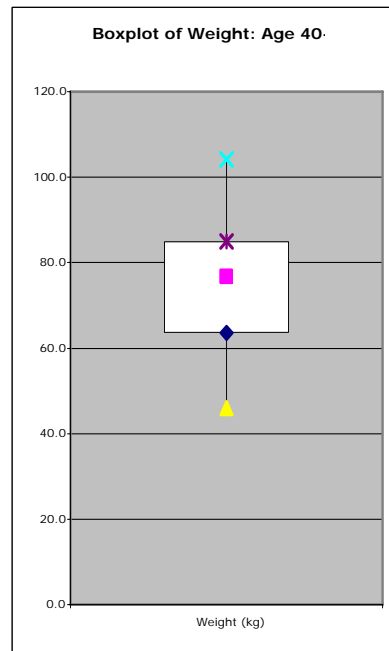
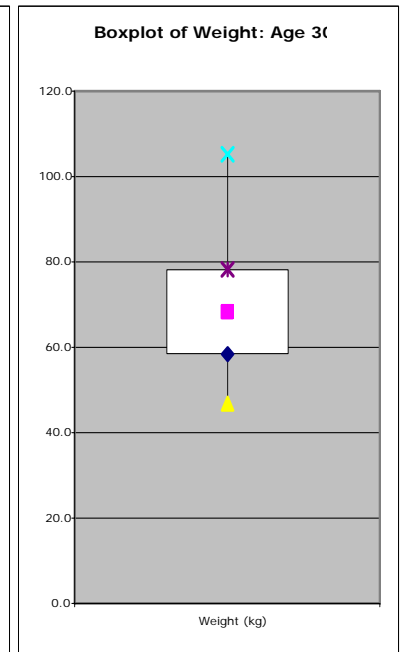
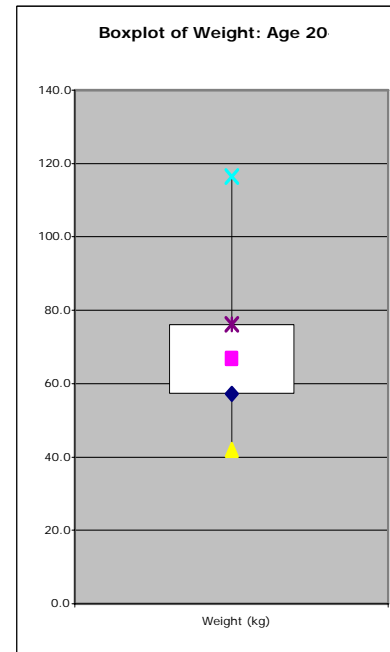
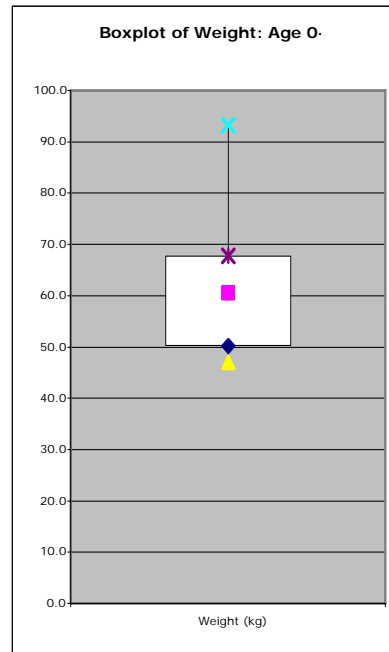


Weight by Age Group

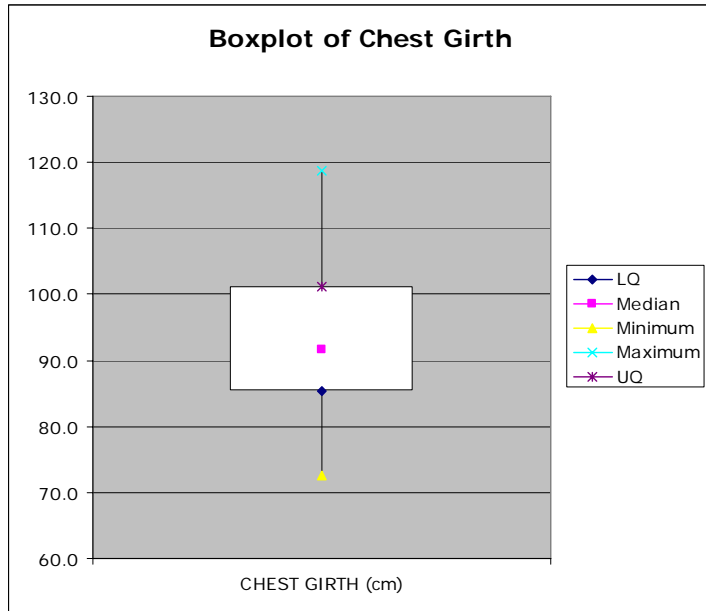
The median weight among the age groups appear to increase until mid-life.

Starting from 60.5 kg. at age group 0-20, it increases to 66.8, 68.3, and 76.8 up to age 50, after which the median weight declines to 73.2 and then to 67.7 kg. This pattern may be due to an increase in bone loss and/or to an increase in medical problems as one ages.

There is a wider area of distribution in weight in the age group 20-30 which includes a minimum weight of 42 kg. to a maximum weight of 116.4 kg. This age bracket is usually a time of transition between school, career, and family planning. The wider distribution in weight may be a reflection of the diversity of life pathways that individuals in this cohort experience at their age and these life decisions can sometimes influence weight fluctuations.



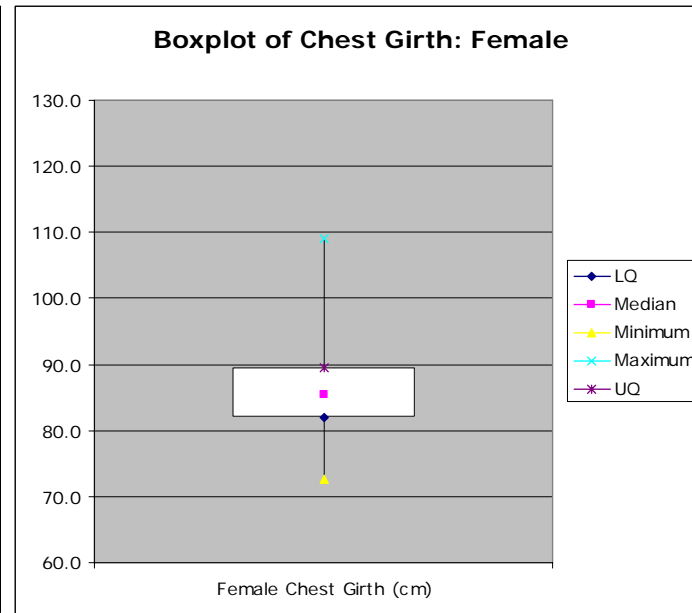
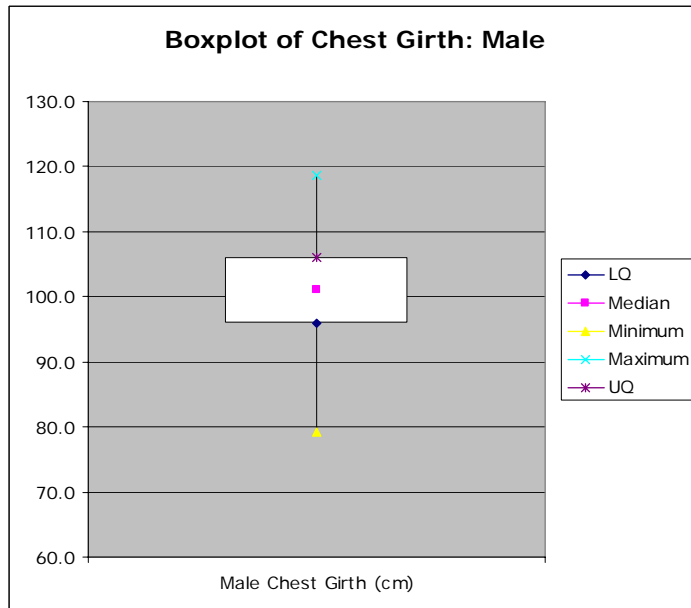
Chest Girth



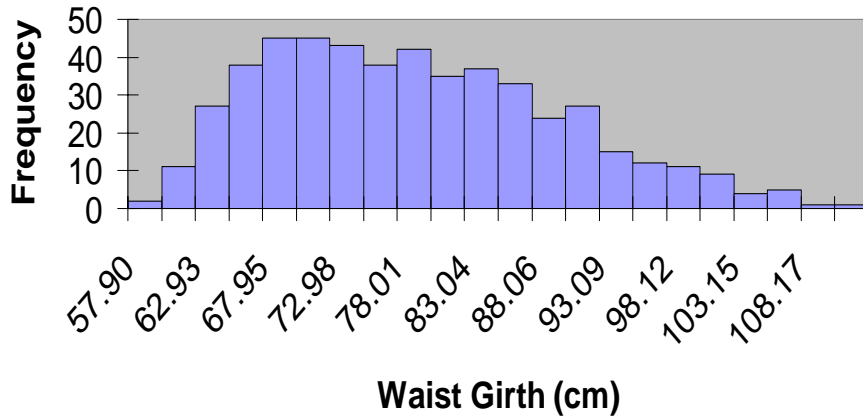
This variable was measured along the nipple line in males and just above breast tissue in females at mid-expiration.

The median chest girth for all the subjects is 91.6 cm. The male subjects include a relatively higher median measurement 101 cm, whereas female subjects have a relatively lower median measurement of 85.5 cm.

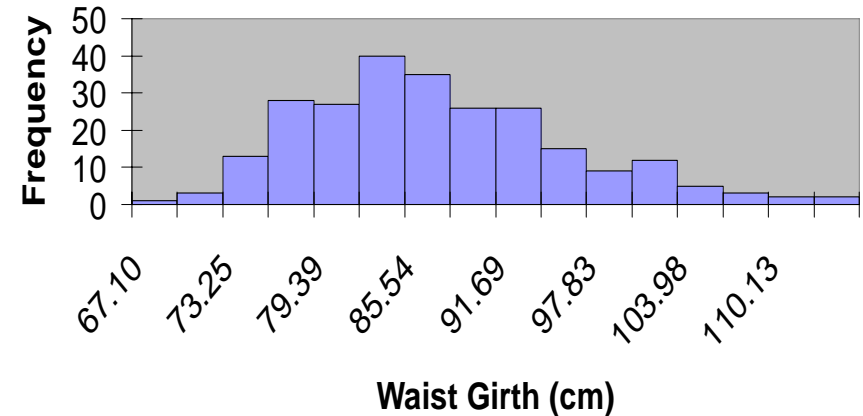
It appears counter-intuitive that the male subjects have a generally higher distribution of chest girth given that there are more breast tissues in females. One can then speculate that skeletal dimorphism may confer a higher measurement of chest girths in men compared to those in women nonetheless.



Histogram of Waist Girth



Histogram of Waist Girth: Male



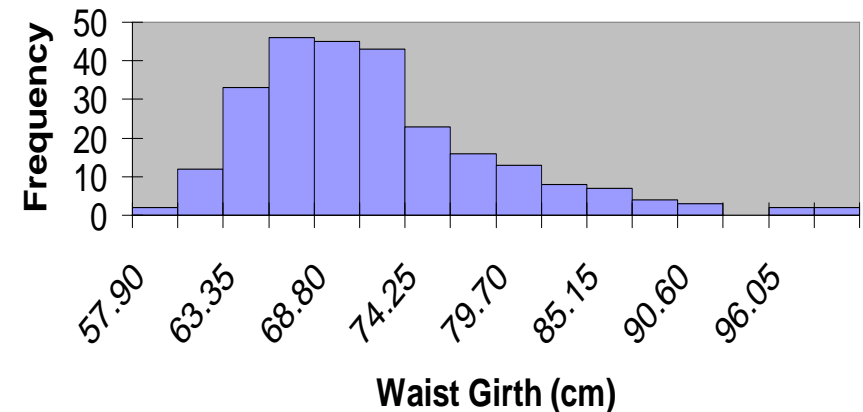
Waist Girth

The shape of all these histograms of waist girth is essentially unimodal. They are generally asymmetric, positively skewed, and well spaced-out.

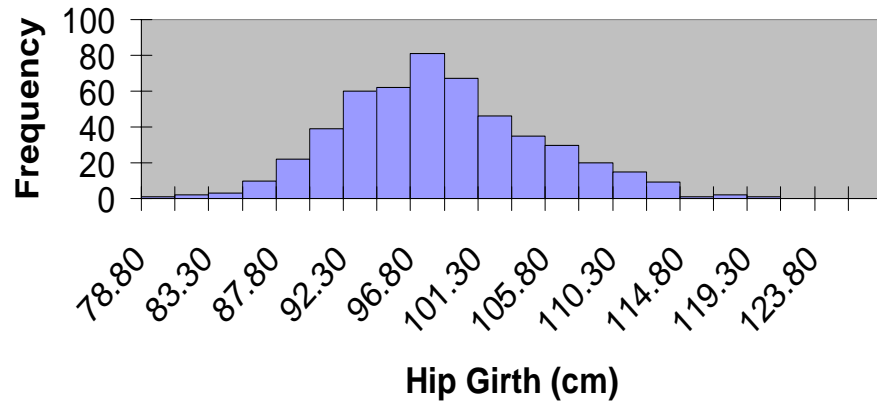
Though the histogram for all waist girth is unimodal, it does have some minor peaks that is influenced by the differences in distribution between the male and female samples. For instance, peaks for male and female waist girths are approximately 82.47 cm. and 66.08 cm. respectively, and the range of distribution are from 67-110+ cm for males and 57-96+ for females. Therefore, the graphs indicate that males generally have a relatively bigger waist girth than females.

The histogram of waist girth in females show a number of potential outliers in the far right of the distribution curve at 96.05 cm. and higher.

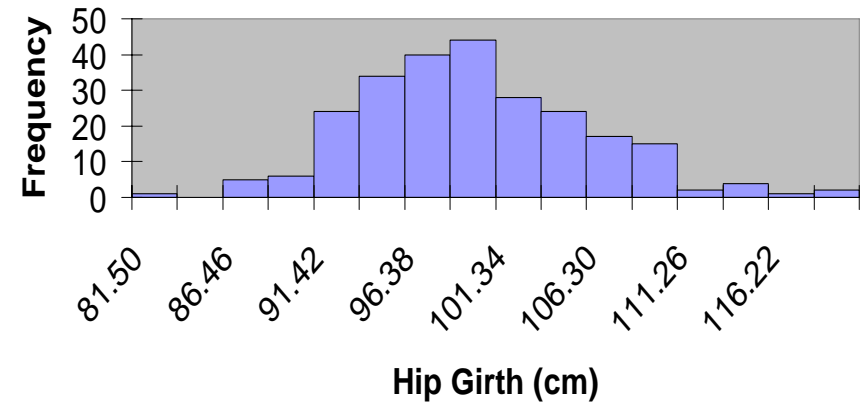
Histogram of Waist Girth: Female



Histogram of Hip girth



Histogram of Hip Girth: Male

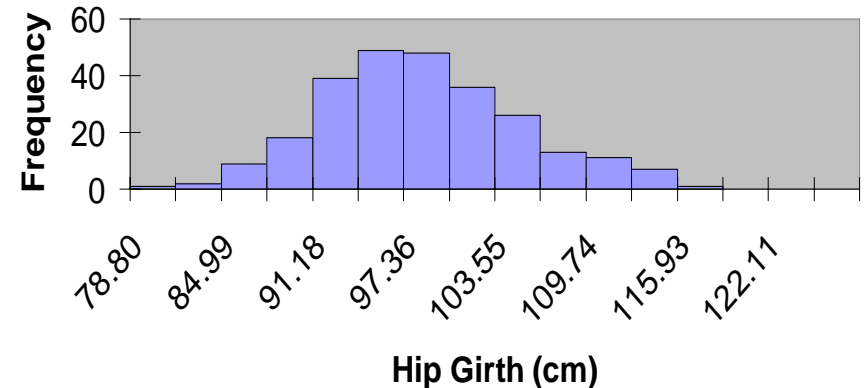


Hip Girth

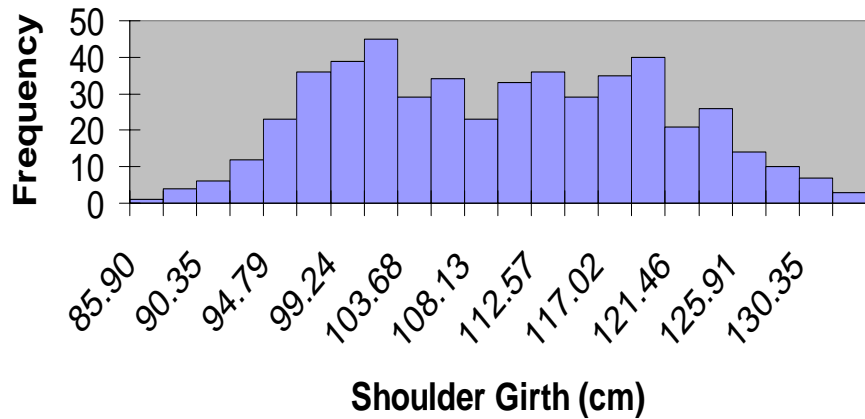
The histogram for hip girth on all measurements is symmetrical and unimodal. The peak lies along 96.80 cm. and the spread is moderately spaced-out. There is an outlier that measures at above 123.80 cm.

Outliers in the male measurements appear on the lower end of the distribution and potentially some on the higher end as well, which gives it a slightly right-skewed shape. The female histogram is more symmetrical with a likely outlier in the far right end of its distribution, measuring above 122.11 cm..

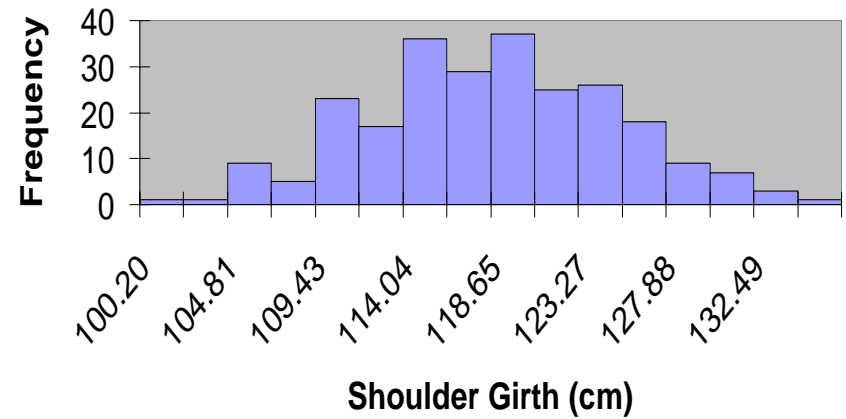
Histogram of Hip Girth: Female



Histogram of Shoulder Girth



Histogram of Shoulder Girth: Male

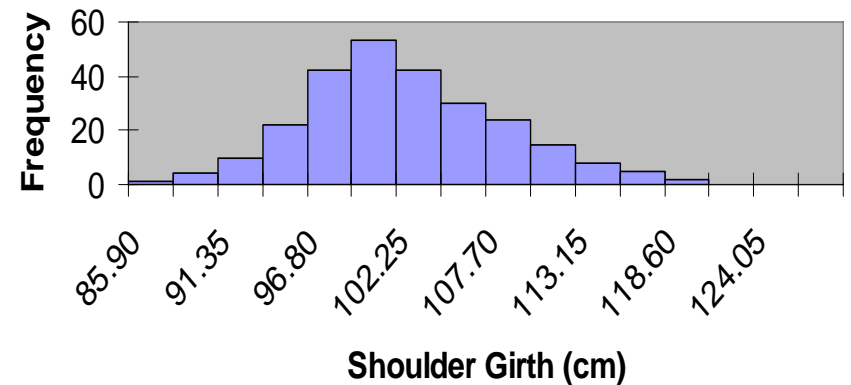


Shoulder Girth

Shoulder girth for all measurements contain many peaks--approximately 3 minor peaks and 2 stronger peaks (around 101.46 cm and 119.24 cm)--and the distribution is well spaced-out.

These variations in peaks appear to be due to the strong dimorphism between males and females on shoulder girth. In males, the center is at approximately 118 cm.; whereas in females, a more definite center is located at approximately 100 cm. Male measurements contain some variability as well with a few minor peaks; whereas female measurements appear more symmetrical around its peak. There is, however, an outlier on the far right of the female distribution at a measurement above 124 cm.

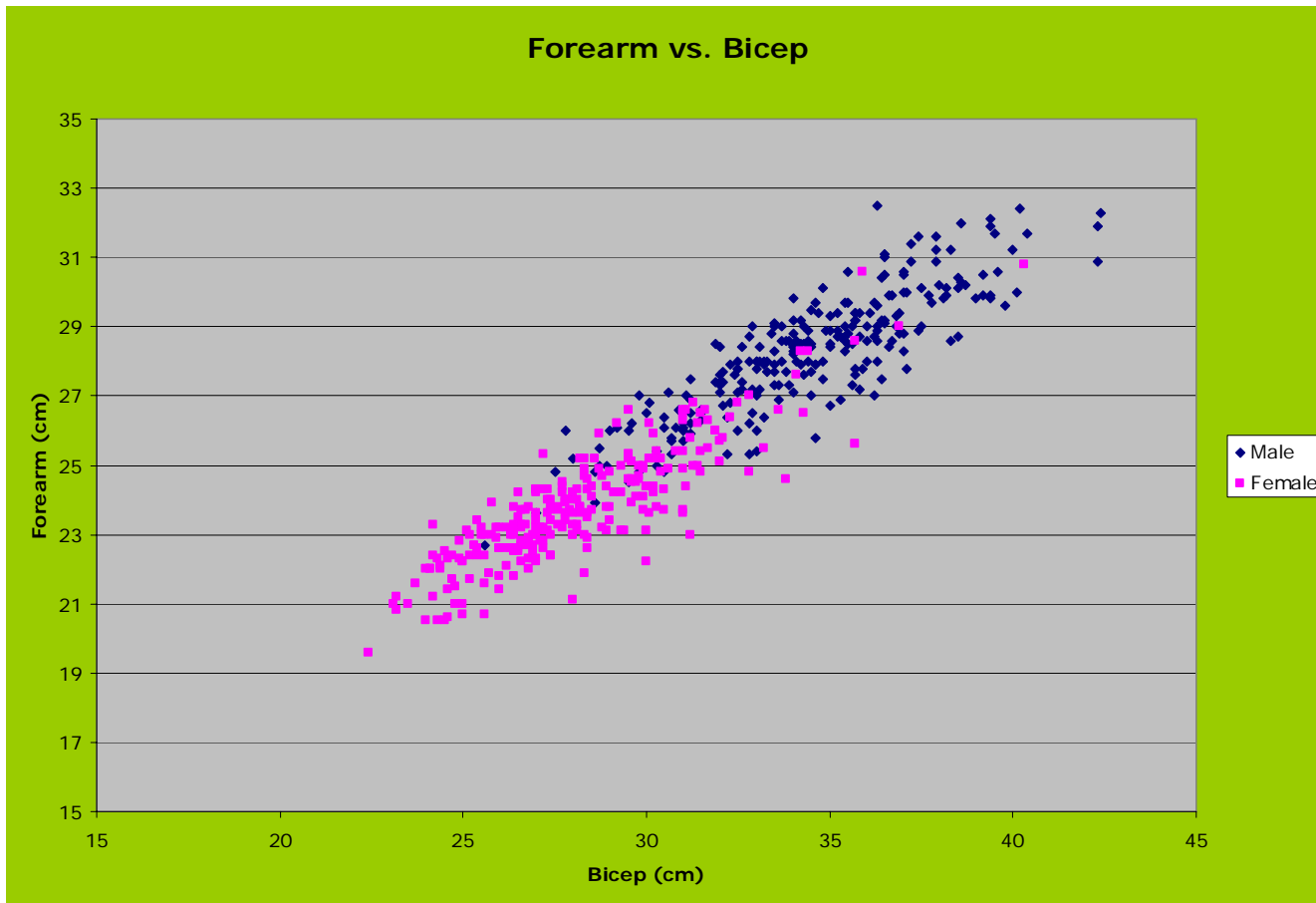
Histogram of Shoulder Girth: Female



Forearm vs. Bicep

There appears to be a strong linear fit between forearm girth and bicep girth. This means that an increase in bicep girth is correlated with an increase in forearm girth. In terms of all measurements, the correlation appears strongest (0.9424). In terms of male and female measurements, the correlation is not as great but strong, nonetheless (0.8647 and 0.8682 respectively). This is perhaps due to the fact that forearm and bicep usage are almost always used synchronously for many, but not all, daily activities. Of additional note is that men have generally bigger forearm and bicep girths than women, as is demonstrated by the data represented in blue below. This is because men usually have higher muscle mass than women,

but there are exceptions, as indicated by the splotches of pink data points interspersed with the male data points.



Correlations

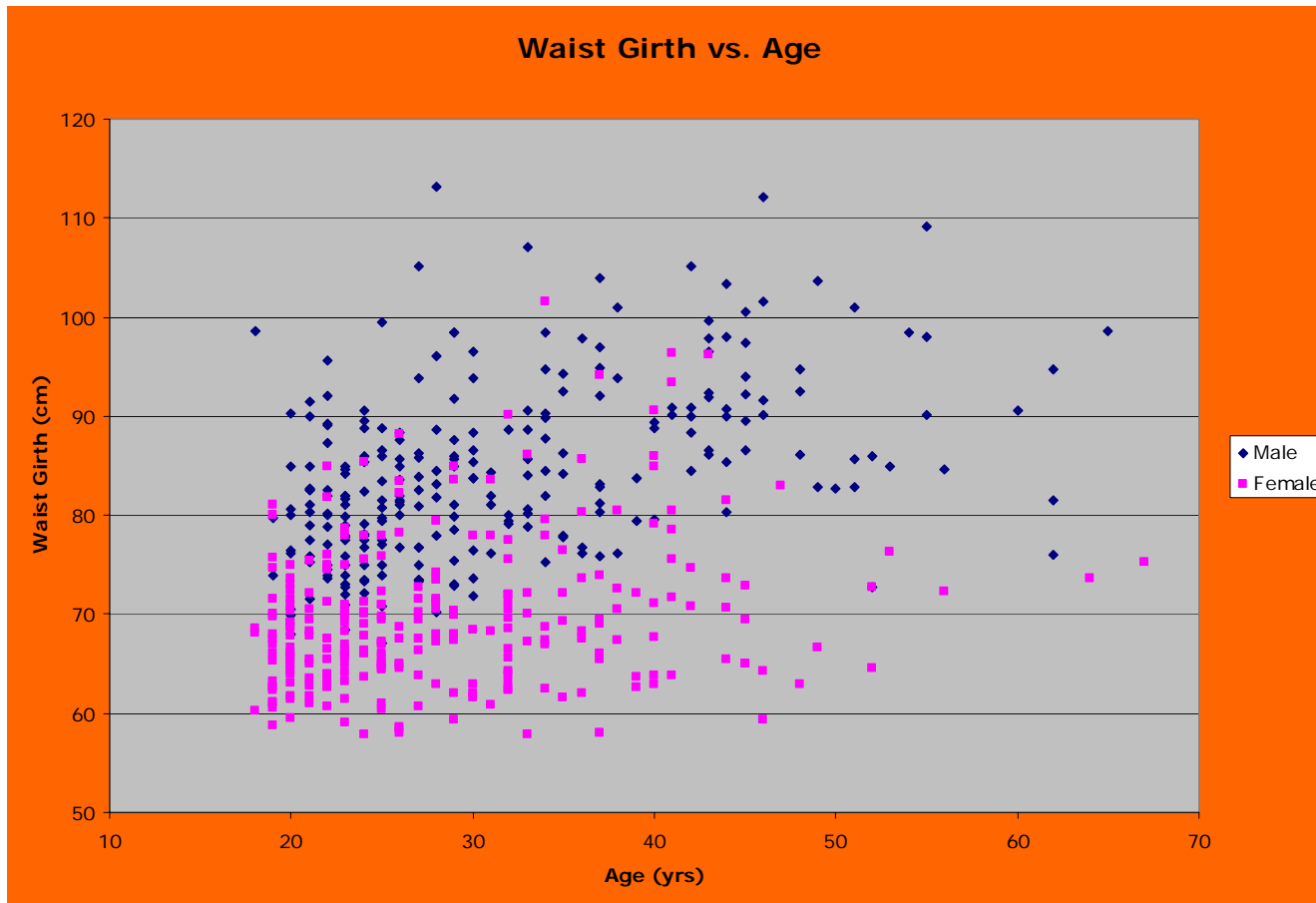
All: 0.9424

Male: 0.8647

Female: 0.8682

Waist Girth vs. Age

A quick look at the graph below indicates little or no linear fit to the waist girth measurements and age on both groups. This means that waist girth has no general correlation with age. In females alone, there is no correlation indicated (0.2489); whereas in males alone, there is only a moderate indication of correlation (0.4571). Data at increasing ages appear less concentrated, but this may be due to fewer subjects at higher age groups.



Correlations

All: 0.3691

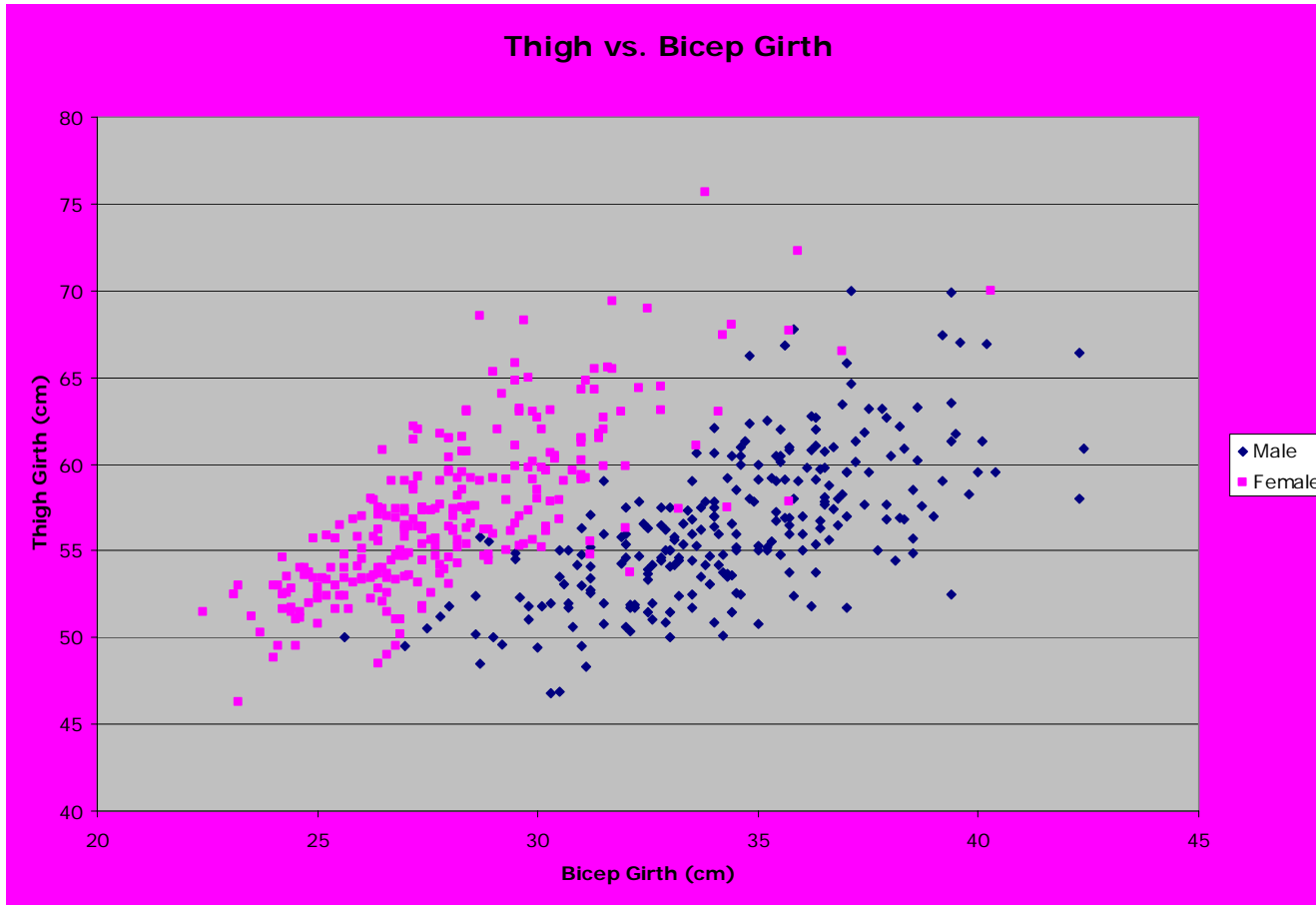
Male: 0.4571

Female: 0.2489

Thigh Girth vs. Bicep Girth

In terms of both male and female measurements combined, there appears to be a weak correlation between thigh girth and bicep girth (0.4115). However, male and female measurements separately show moderate degrees of correlation (0.6624, 0.7492 respectively). The weak correlations seen here may be due to the fact that there's little functional synchronicity between the two anatomical structures; however, in terms of bodily proportions, the ratio between these two variables are usually constant. Again, at least one of the variables is generally

greater for men than women, as is the case with bicep girth.



Correlation

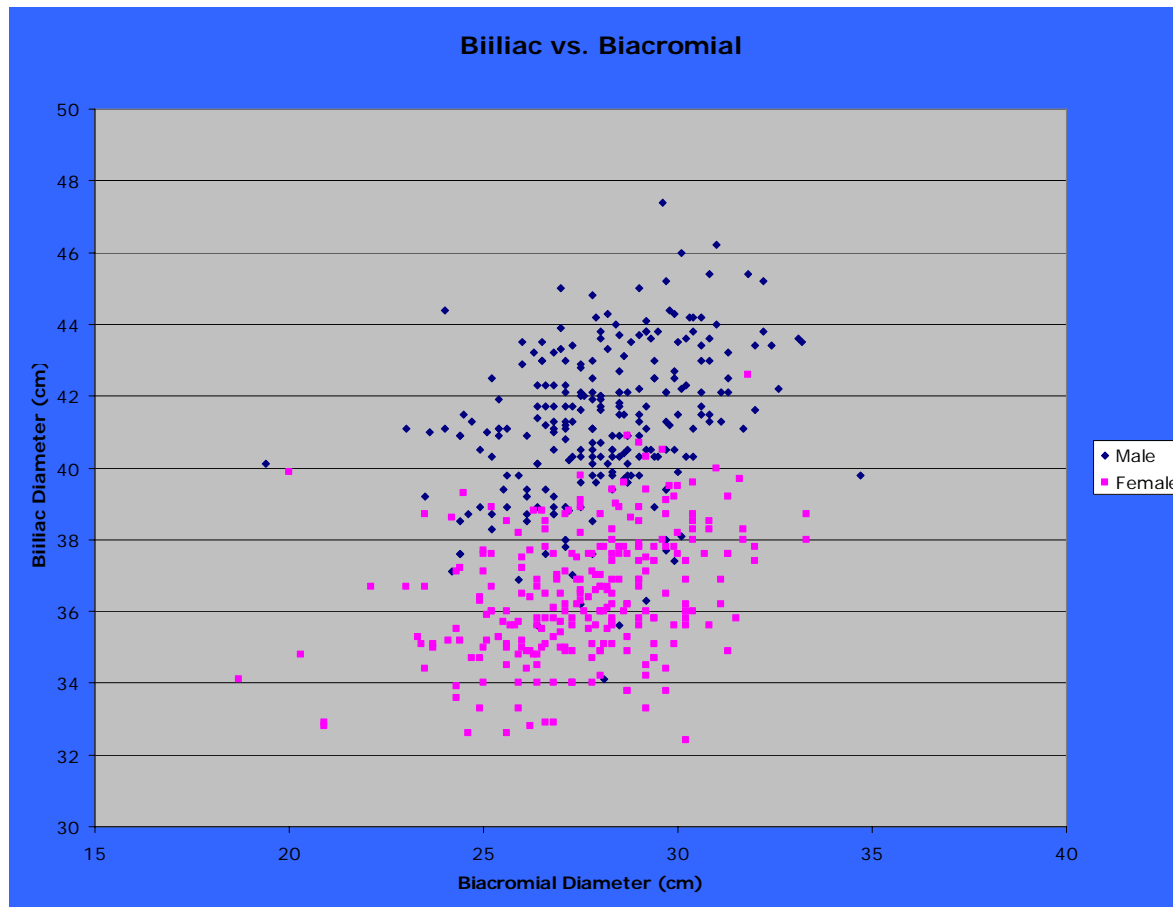
All: 0.4115

Male: 0.6624

Female: 0.7492

Biiliac vs. Biacromial

These set of variables have the least indication of linear fit. In fact, there is hardly any pattern of linearity in the graph below. Correlation values do indicate a slight correlation (all: 0.3090; male: 0.3491; female: 0.3563) as opposed to none at all. This may be largely due to proportionality constants in certain anatomical structures. The graph shows that male biiliac diameters are bigger than those of females. Generally, men have broader shoulders than women and the biiliac measurements are essentially the shoulder bones.



Correlation

All: 0.3090

Male: 0.3491

Female: 0.3563