

Tooth Growth T-Test Comparison

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Overview

Use the ToothGrowth data set, compare the lengths of guinea pigs' teeth by delivery method and by dosage.

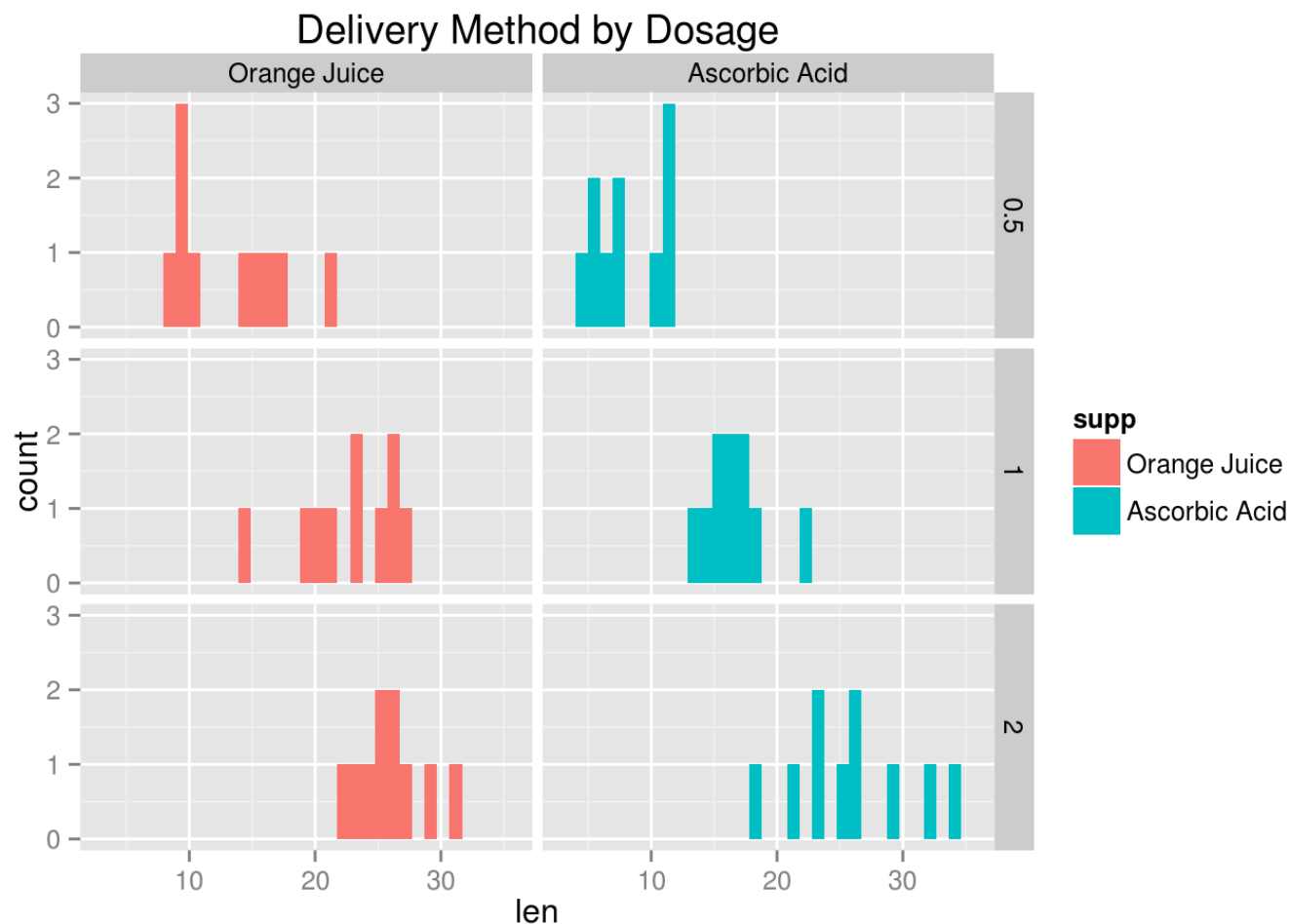
Initial Exploratory Analysis

There are two delivery methods and 3 dosage levels of vitamins that were given to the guinea pigs. The average tooth lengths are given below.

```
##  
## Attaching package: 'dplyr'  
##  
## The following object is masked from 'package:stats':  
##  
##     filter  
##  
## The following objects are masked from 'package:base':  
##  
##     intersect, setdiff, setequal, union
```

```
## Source: local data frame [2 x 3]  
##  
##   supp totals  lenMean  
## 1    OJ      30 20.66333  
## 2    VC      30 16.96333
```

The following plot shows that increase dosage levels might cause an increase in tooth length. It's unclear if delivery methods had an effect.



T-Tests

A non-paired t-test was performed on the two delivery methods. Since the delivery methods were used on two different sets of pigs, the test should be unpaired. Since zero is in the confidence interval, we cannot attribute any differences in tooth length to the delivery methods.

```
##
## Welch Two Sample t-test
##
## data:  oj$len and vc$len
## t = 1.9153, df = 55.309, p-value = 0.06063
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.1710156  7.5710156
## sample estimates:
## mean of x mean of y
## 20.66333 16.96333
```

A non-paired t-test was performed on the lowest dosage level group and the highest dosage level group. Since zero is not in the confidence interval, we can attribute some of the differences in tooth length to the dosage level.

```
##  
## Welch Two Sample t-test  
##  
## data: lowdose$len and highdose$len  
## t = -11.799, df = 36.883, p-value = 4.398e-14  
## alternative hypothesis: true difference in means is not equal to 0  
## 95 percent confidence interval:  
## -18.15617 -12.83383  
## sample estimates:  
## mean of x mean of y  
## 10.605 26.100
```