bone

xiaofei_wu

2/8/2020

```r
###read the raw data
# ●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●
pacman::p_load(readxl,vioplot,ggplot2,tidyverse,stringr)


###data wrangling
# ●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●
mydata <- read_excel("Saw Data Collection.xlsx",sheet = 2,col_names = TRUE,skip = 1)
```

```
## New names:
## * `` -> ...13
## * `` -> ...14
```

```r
mydata <- mydata[-13]
mydata <- mydata[-13]

mydata <- dplyr::mutate(mydata,Saw = substr(`Saw ID`, 1,1))
#filter with hand saw
subdata <- filter(mydata,str_detect(Saw, "A|B|C|D|E|F|G|J|K|L|M"))


###EDA
# ●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●●
#Unrestrained vs restrained (hand)
datasplit <- split(mydata,mydata$`Restrained/Unrestrained`)
x1 <- datasplit[[1]]
x2 <- datasplit[[2]]


#scatter plot
p1 <- ggplot(subdata,aes(x = subdata$`Restrained/Unrestrained`,y = Minimum)) +geom_point(aes(color = sul
  labs(title = "Minimum Width \nRestrained vs Unrestrained\nscatter plot",x="Hand Saw", y="Minimum Widtl
  theme(text = element_text(face = "bold",color = "steelblue"))+
  scale_color_discrete(name = "Hand Saw Type")
p1
```

Minimum Width
Restrained vs Unrestrained
scatter plot
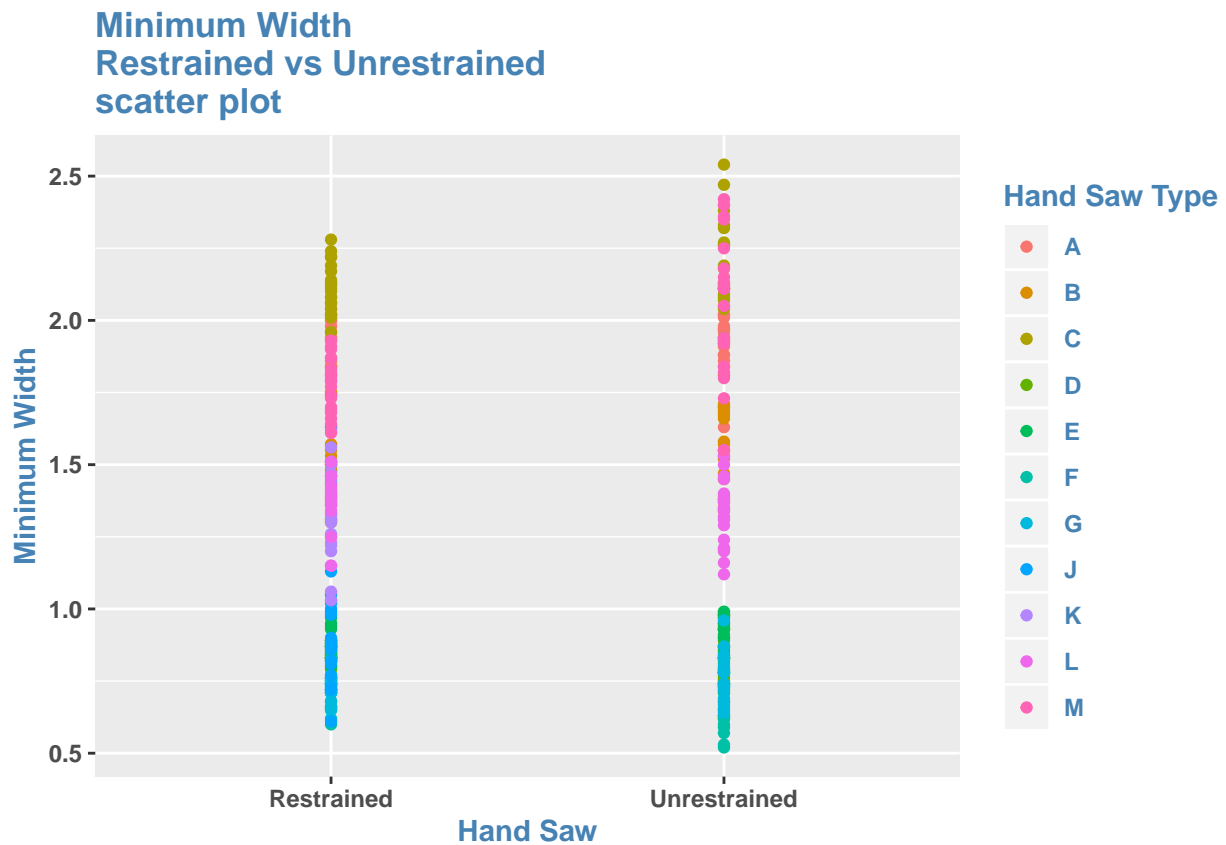

```r
#boxplot
#Upper bound: 75th Percentile; Lower bound: 25 Percentile; The "Notch": 95% confidence interval of the
p2 <- ggplot(subdata, aes(x = subdata$`Restrained/Unrestrained`, subdata$Minimum))+
  geom_boxplot(aes(fill =`Restrained/Unrestrained`),notch = T)+
  labs(title = "Minimum Width \nRestrained vs Unrestrained\nboxplot", x="Hand Saw", y="Minimum Width")+
  theme(text = element_text(face = "bold",color = "steelblue"))
p2
```

Minimum Width Restrained vs Unrestrained boxplot
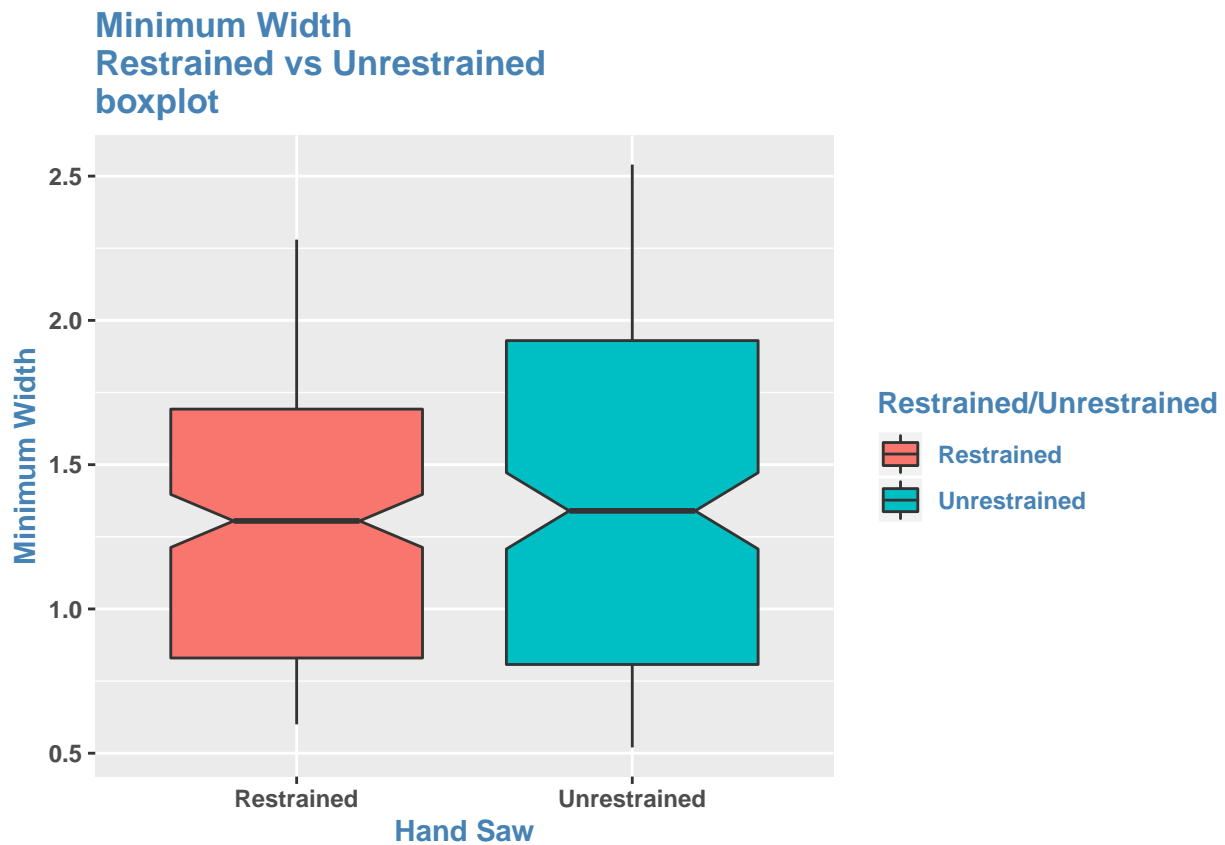

```
#Violin
#Violin plot shows the entire distribution of the data.
p3 <- ggplot(subdata,aes(x = subdata$`Restrained/Unrestrained`, subdata$Minimum))+
  geom_violin(aes(fill =`Restrained/Unrestrained`))+
  labs(title = "Minimum Width \nRestrained vs Unrestrained\nViolin", x="Hand Saw", y="Minimum Width")+
  theme(text = element_text(face = "bold",color = "steelblue"))
p3
```
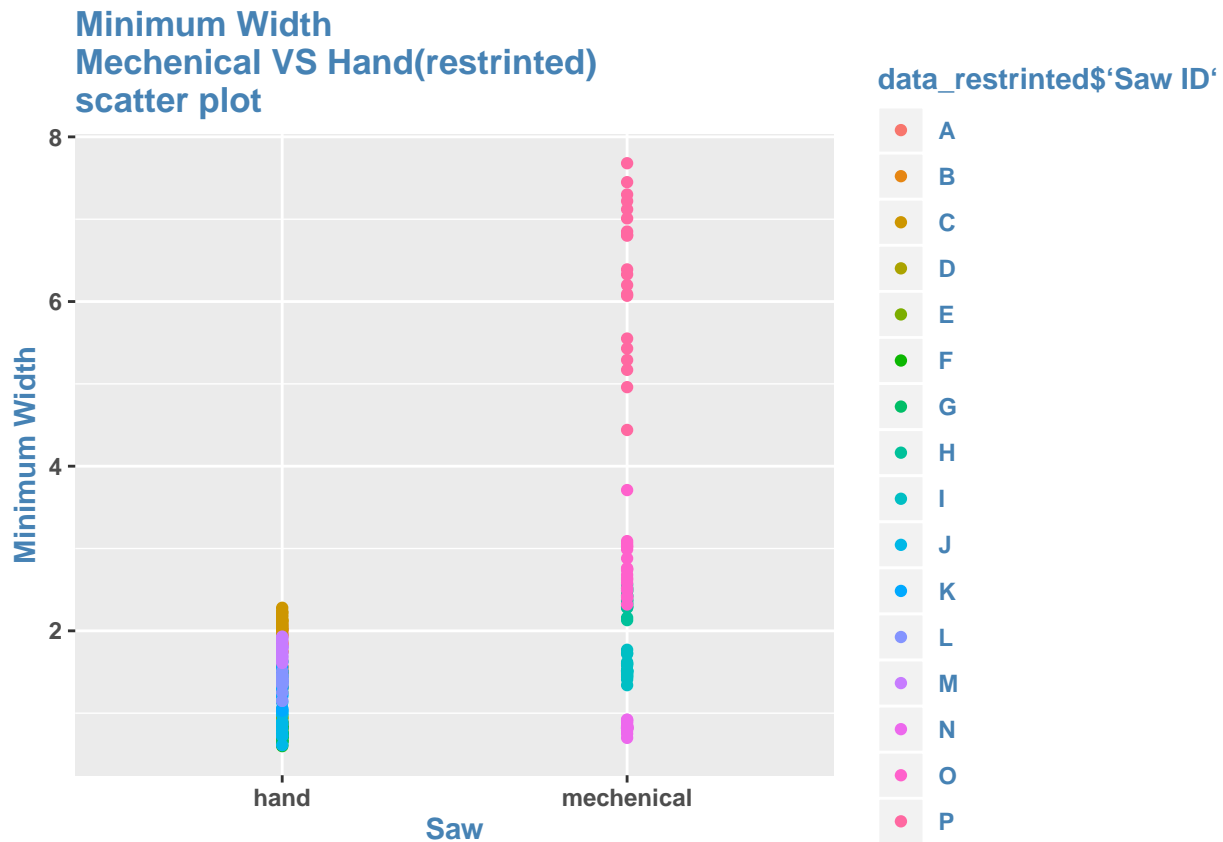
Minimum Width
Restrained vs Unrestrained
Violin
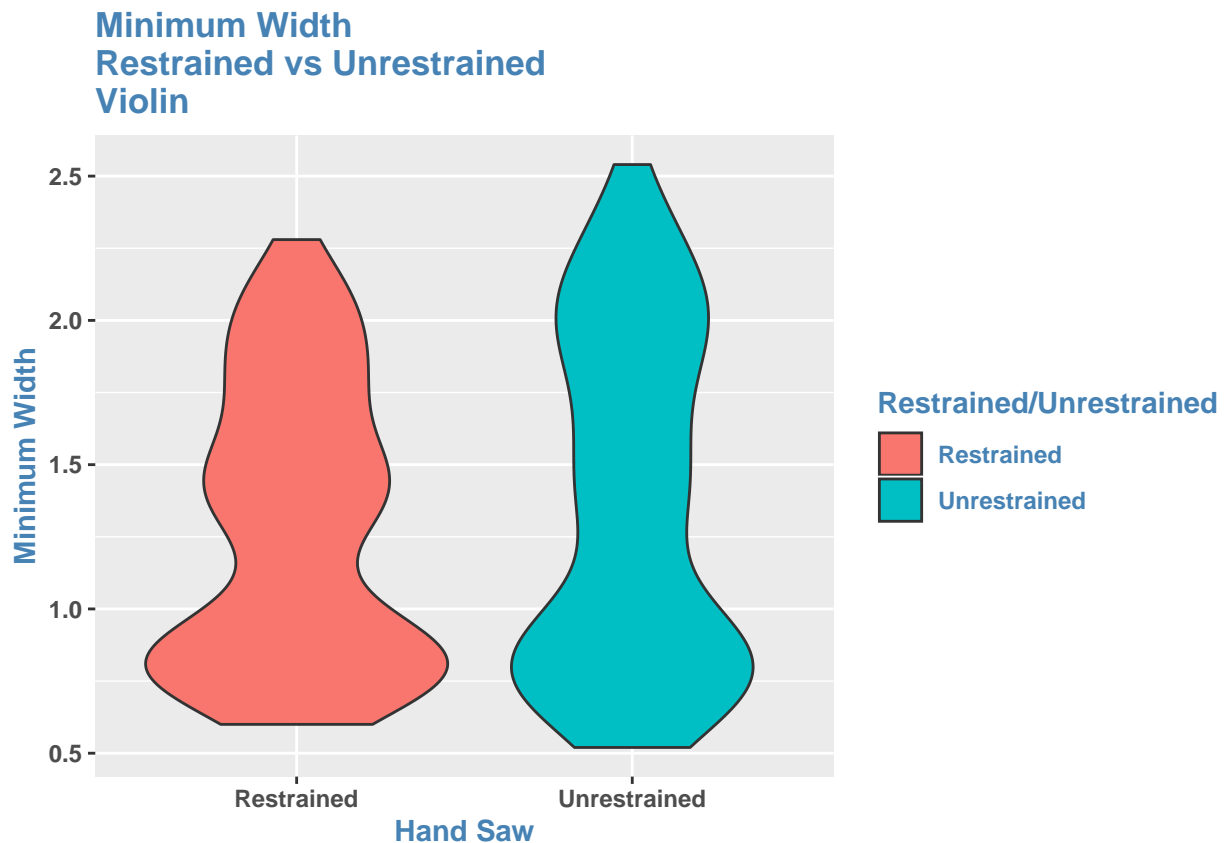
readin

```
## Mechenical VS Hand(restrinted)

attach(mydata)
# filter out the restrinted part
data_restrinted <- split(mydata,mydata$`Restrained/Unrestrained`)[[1]]
#filter with hand or mechenical saw
hand_restrinted <- filter(data_restrinted,str_detect(Saw, "A|B|C|D|E|F|G|J|K|L|M"))
mechenical_restrinted <- filter(data_restrinted,str_detect(Saw, "H|I|O|N|P"))

hand_restrinted$HorM = "hand"
mechenical_restrinted$HorM = "mechenical"
# combine both methods as restrinted data
data_restrinted = rbind(hand_restrinted,mechenical_restrinted)[,-13]
attach(data_restrinted)
```

```
## The following objects are masked from mydata:
##
##     1, 2, 3, 4, 5, 6, Bone ID, Cut, Maximum, Minimum,
##     Restrained/Unrestrained, Saw ID
```

```
# scatter plot
p4<-ggplot(data_restrinted,aes(x=HorM, y=Minimum))+
  geom_point(aes(color = data_restrinted$`Saw ID`))+
  labs(title = "Minimum Width \nMechenical VS Hand(restrinted)\nscatter plot",x="Saw", y="Minimum Width
  theme(text = element_text(face = "bold",color = "steelblue"))
p4
```

**Minimum Width
Mechenical VS Hand(restrinted)
scatter plot**


```
# boxplot
p5<-ggplot(data_restrinted,aes(x=HorM, y=Minimum))+
  geom_boxplot(aes(fill= `HorM`),notch = TRUE)+
  labs(title = "Minimum Width \nMechenical VS Hand(restrinted)\nboxplot",x="Saw Type", y="Minimum Width
  theme(text = element_text(face = "bold",color = "steelblue"))
p5
```

Minimum Width
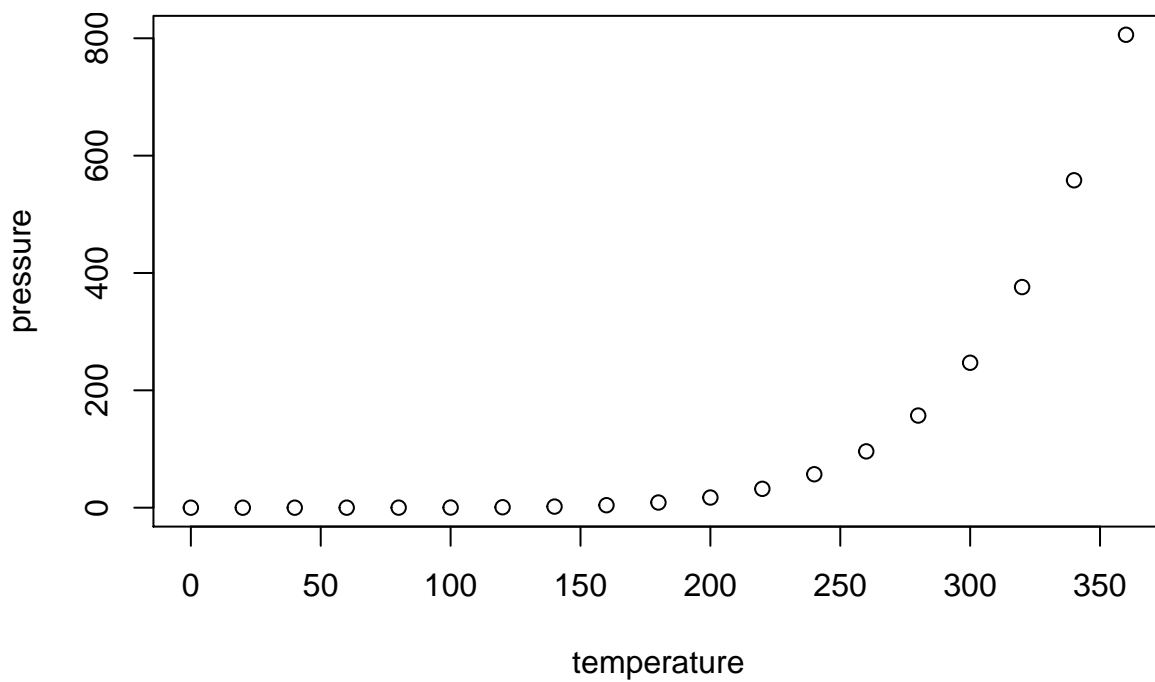**Mechenical VS Hand(restrinted)**
boxplot
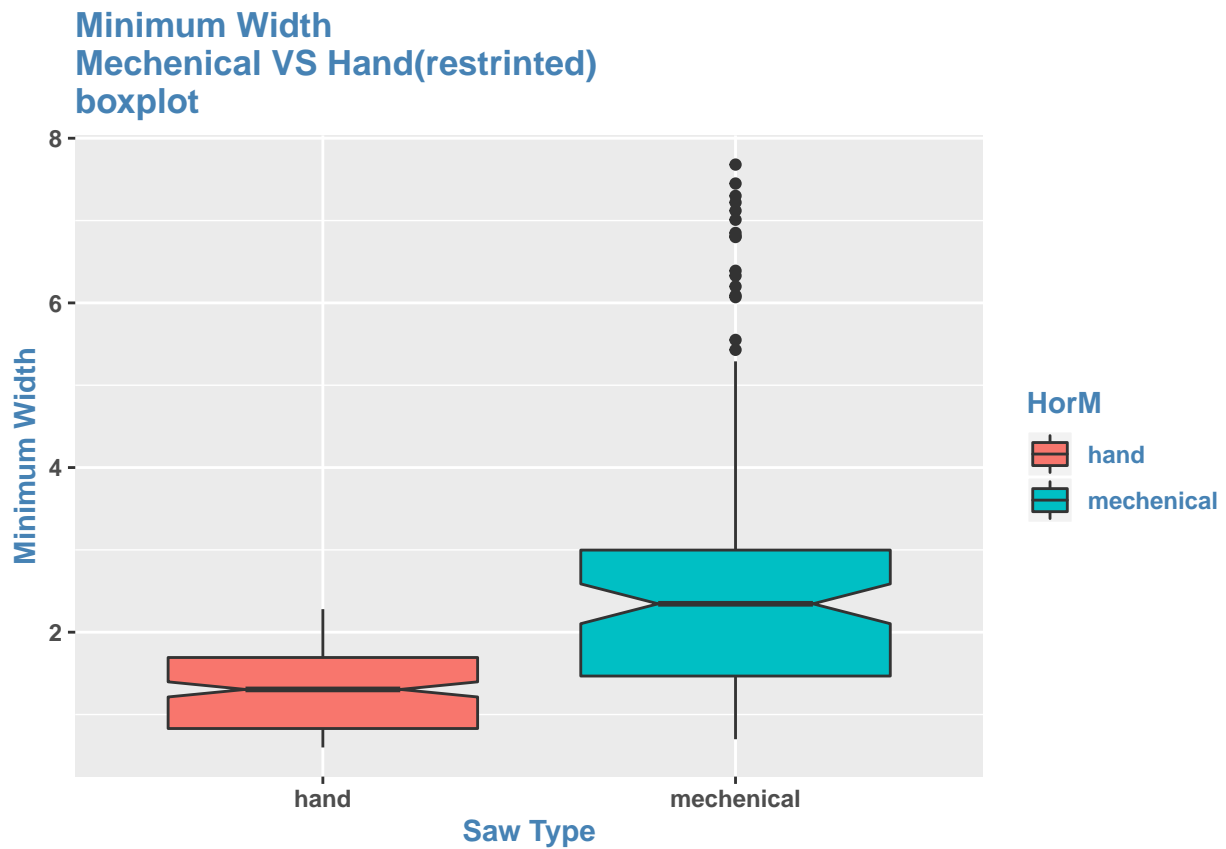

```
# Violin
p6<-ggplot(data_restrinted,aes(x=HorM, y=Minimum))+
  geom_violin(aes(fill= `HorM`))+
  labs(title = "Minimum Width \nMechenical VS Hand(restrinted)\nViolin",x="Saw Type", y="Minimum Width")
  theme(text = element_text(face = "bold",color = "steelblue"))

p6
```

Minimum Width
Mechenical VS Hand(restrinted)
Violin
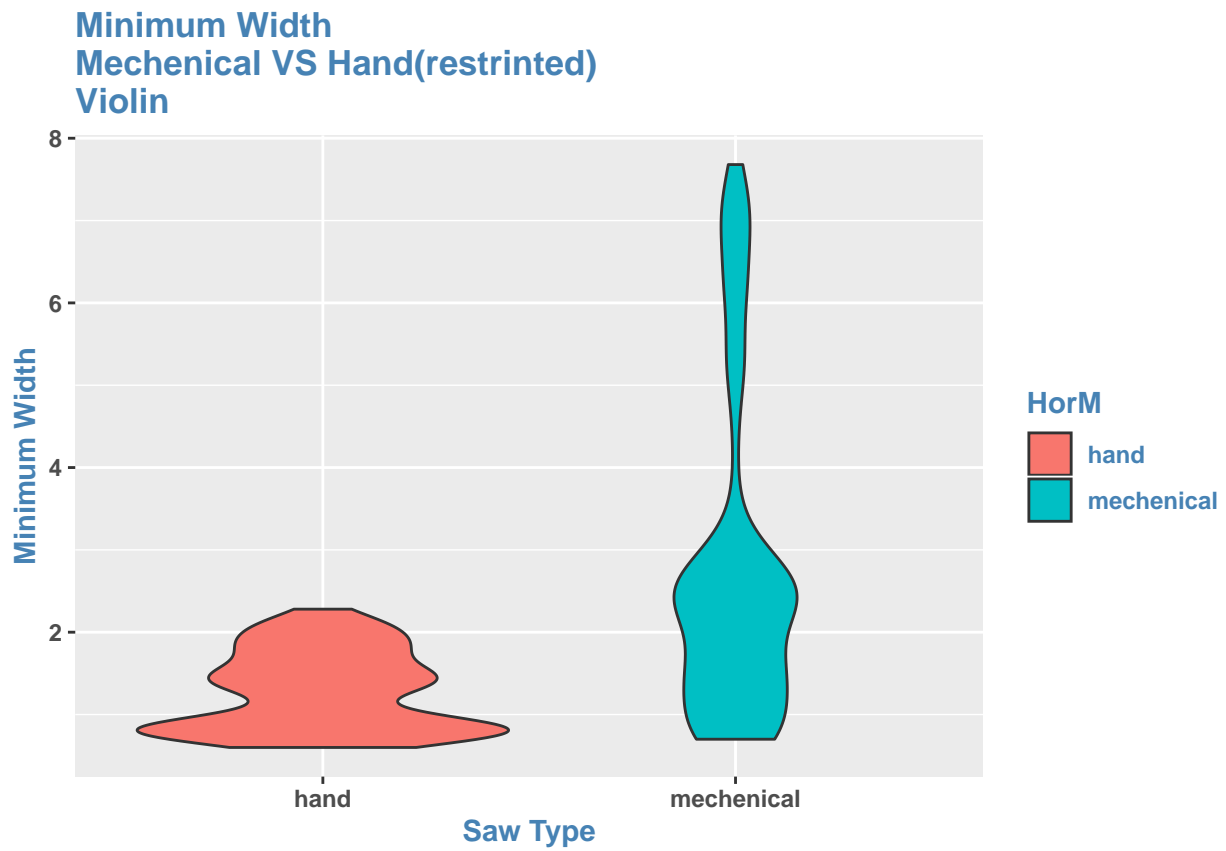
Including Plots

You can also embed plots, for example:

Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.