

R Notebook

Code ▾

Filtering tractography with FA and FOD: Dice Results Preview

Introduction

Loading datas

There are 2 dataframes with results for filtering tracks with their mean FA and FOD values

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```
library(ggplot2)
```

Registered S3 methods overwritten by 'ggplot2':

method	from
[.quosures	rlang
c.quosures	rlang
print.quosures	rlang

Need help getting started? Try the cookbook for R: <http://www.cookbook-r.com/Graphs/>

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```
FA_Dice_Array_init <- read.csv("../../Table des résultats/FA_Dice_Array.csv")
```

```
FOD_Dice_Array_init <- read.csv("../../Table des résultats/FOD_Dice_Array.csv")
```

Pré traitement

Fusion des groupe gauche et droit

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```
levels(FA_Dice_Array_init$Nerve) <- c(levels(FA_Dice_Array_init$Nerve), c("III", "NF", "NM", "V"))
```

```
FA_Dice_Array_init$Nerve[FA_Dice_Array_init$Nerve == 'IIID' | FA_Dice_Array_init$Nerve == 'IIIG'] <- "III"
```

```
FA_Dice_Array_init$Nerve[FA_Dice_Array_init$Nerve == 'NFD' | FA_Dice_Array_init$Nerve == 'NFG'] <- "NF"
```

```
FA_Dice_Array_init$Nerve[FA_Dice_Array_init$Nerve == 'NMD' | FA_Dice_Array_init$Nerve == 'NMG'] <- "NM"
```

```
FA_Dice_Array_init$Nerve[FA_Dice_Array_init$Nerve == 'VD' | FA_Dice_Array_init$Nerve == 'VG'] <- "V"
```

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```

levels(FOD_Dice_Array_init$Nerve) <- c(levels(FOD_Dice_Array_init$Nerve), c("II
I","NF","NM","V"))
FOD_Dice_Array_init$Nerve[FOD_Dice_Array_init$Nerve == 'IIID' | FOD_Dice_Array_ini
t$Nerve == 'IIIG'] <- "III"
FOD_Dice_Array_init$Nerve[FOD_Dice_Array_init$Nerve == 'NFD' | FOD_Dice_Array_ini
t$Nerve == 'NFG'] <- "NF"
FOD_Dice_Array_init$Nerve[FOD_Dice_Array_init$Nerve == 'NMD' | FOD_Dice_Array_ini
t$Nerve == 'NMG'] <- "NM"
FOD_Dice_Array_init$Nerve[FOD_Dice_Array_init$Nerve == 'VD' | FOD_Dice_Array_ini
t$Nerve == 'VG'] <- "V"

```

Homogénéisation des variation du seuil de FA

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```

levels(FA_Dice_Array_init$Condition) <- c(levels(FA_Dice_Array_init$Condition), c
("FA1","FA2","FA3","FA4"))
FA_Dice_Array_init$Condition[FA_Dice_Array_init$Condition == '_fa_0.1' & FA_Dice_A
rray_init$Nerve == 'NM'] <- "FA1"
FA_Dice_Array_init$Condition[FA_Dice_Array_init$Condition == '_fa_0.13' & FA_Dice_
Array_init$Nerve == 'NM'] <- "FA2"
FA_Dice_Array_init$Condition[FA_Dice_Array_init$Condition == '_fa_0.16' & FA_Dice_A
rray_init$Nerve == 'NM'] <- "FA3"
FA_Dice_Array_init$Condition[FA_Dice_Array_init$Condition == '_fa_0.2' & FA_Dice_A
rray_init$Nerve == 'NM'] <- "FA4"
FA_Dice_Array_init$Condition[FA_Dice_Array_init$Condition == '_fa_0.2'] <- "FA1"
FA_Dice_Array_init$Condition[FA_Dice_Array_init$Condition == '_fa_0.23' ] <- "FA2"
FA_Dice_Array_init$Condition[FA_Dice_Array_init$Condition == '_fa_0.26'] <- "FA3"
FA_Dice_Array_init$Condition[FA_Dice_Array_init$Condition == '_fa_0.3' ] <- "FA4"

```

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```

levels(FOD_Dice_Array_init$Condition) <- c(levels(FOD_Dice_Array_init$Condition),
c("FA1","FA2","FA3","FA4"))
FOD_Dice_Array_init$Condition[FOD_Dice_Array_init$Condition == '_fa_0.1' & FOD_Dic
e_Array_init$Nerve == 'NM'] <- "FA1"
FOD_Dice_Array_init$Condition[FOD_Dice_Array_init$Condition == '_fa_0.13' & FOD_Di
ce_Array_init$Nerve == 'NM'] <- "FA2"
FOD_Dice_Array_init$Condition[FOD_Dice_Array_init$Condition == '_fa_0.16' & FOD_Dic
e_Array_init$Nerve == 'NM'] <- "FA3"
FOD_Dice_Array_init$Condition[FOD_Dice_Array_init$Condition == '_fa_0.2' & FOD_Dic
e_Array_init$Nerve == 'NM'] <- "FA4"
FOD_Dice_Array_init$Condition[FOD_Dice_Array_init$Condition == '_fa_0.2'] <- "FA1"
FOD_Dice_Array_init$Condition[FOD_Dice_Array_init$Condition == '_fa_0.23' ] <- "FA
2"
FOD_Dice_Array_init$Condition[FOD_Dice_Array_init$Condition == '_fa_0.26'] <- "FA
3"
FOD_Dice_Array_init$Condition[FOD_Dice_Array_init$Condition == '_fa_0.3' ] <- "FA
4"

```

Visualisation

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```
summary(FA_Dice_Array_init)
```

Patient Index	Nerve Dice_init	Parametre	Condition	Dice_max
AS012 :171	III :304	FA :276	1DIM1 : 69	Min. :0.0000
n. : 1.00	Min. :0.0000			
BF009 :171	NF :304	ROI_increase:345	1DIM2 : 69	1st Qu.:0.6362
Qu.: 50.00	1st Qu.:0.4910			
BM013 :171	V :304	ROI_moveLat :345	1DIM3 : 69	Median :0.8430
ian : 87.00	Median :0.7608			
GF006 :171	NM :266	ROI_movePos :345	1DIM4 : 69	Mean :0.7459
n : 72.56	Mean :0.6719			
MG007 :171	Chiasma:133		1DIM5 : 69	3rd Qu.:0.9440
Qu.:100.00	3rd Qu.:0.9127			
MV011 :171	IIID : 0		2DIM1 : 69	Max. :1.0000
x. :100.00	Max. :1.0000			
(Other):285	(Other): 0		(Other):897	

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```
summary(FOD_Dice_Array_init)
```

Patient Index	Nerve Dice_init	Parametre	Condition	Dice_max
AS012 :171	III :304	FA :276	1DIM1 : 69	Min. :0.0000
n. : 1.00	Min. :0.0000			
BF009 :171	NF :304	ROI_increase:345	1DIM2 : 69	1st Qu.:0.6478
Qu.: 57.00	1st Qu.:0.4910			
BM013 :171	V :304	ROI_moveLat :345	1DIM3 : 69	Median :0.8815
ian : 75.00	Median :0.7608			
GF006 :171	NM :266	ROI_movePos :345	1DIM4 : 69	Mean :0.7592
n : 69.89	Mean :0.6719			
MG007 :171	Chiasma:133		1DIM5 : 69	3rd Qu.:0.9578
Qu.: 90.00	3rd Qu.:0.9127			
MV011 :171	IIID : 0		2DIM1 : 69	Max. :1.0000
x. :100.00	Max. :1.0000			
(Other):285	(Other): 0		(Other):897	

On a un certain nombre de valeur nule qui correspondent à des données manquante. On va les supprimer

Supression des données incomplètes

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```
FA_Dice_Array <- subset(FA_Dice_Array_init,Dice_init !=0)
FOD_Dice_Array <- subset(FOD_Dice_Array_init,Dice_init !=0)
```

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summary(FA_Dice_Array)

Patient Index	Nerve Dice_init	Parametre	Condition	Dice_max
AS012 :171	III :295	FA :267	INC1 : 67	Min. :0.0170
n. : 1.00	Min. :0.007968			
GF006 :171	V :285	ROI_increase:335	INC2 : 67	1st Qu.:0.6759
Qu.: 58.00	1st Qu.:0.542046			
MV011 :170	NF :265	ROI_moveLat :319	INC3 : 67	Median :0.8571
ian : 90.00	Median :0.779133			
MG007 :167	NM :262	ROI_movePos :317	INC4 : 67	Mean :0.7899
n : 76.67	Mean :0.711495			
BF009 :164	Chiasma:131		INC5 : 67	3rd Qu.:0.9490
Qu.:100.00	3rd Qu.:0.917749			
BM013 :154	IIID : 0		FA1 : 67	Max. :1.0000
x. :100.00	Max. :1.000000			
(Other):241	(Other): 0		(Other):836	

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summary(FOD_Dice_Array)

Patient Index	Nerve Dice_init	Parametre	Condition	Dice_max
AS012 :171	III :295	FA :267	INC1 : 67	Min. :0.007968
in. : 8.00	Min. :0.007968			
GF006 :171	V :285	ROI_increase:335	INC2 : 67	1st Qu.:0.705407
st Qu.: 60.00	1st Qu.:0.542046			
MV011 :170	NF :265	ROI_moveLat :319	INC3 : 67	Median :0.890916
edian : 77.00	Median :0.779133			
MG007 :167	NM :262	ROI_movePos :317	INC4 : 67	Mean :0.803998
ean : 73.84	Mean :0.711495			
BF009 :164	Chiasma:131		INC5 : 67	3rd Qu.:0.960435
rd Qu.: 91.00	3rd Qu.:0.917749			
BM013 :154	IIID : 0		FA1 : 67	Max. :1.000000
ax. :100.00	Max. :1.000000			
(Other):241	(Other): 0		(Other):836	

On va travailler sur 4 parametres:

1. FA_threshold
2. ROI Increase
3. ROI Move Pos
4. ROI Mode Lat

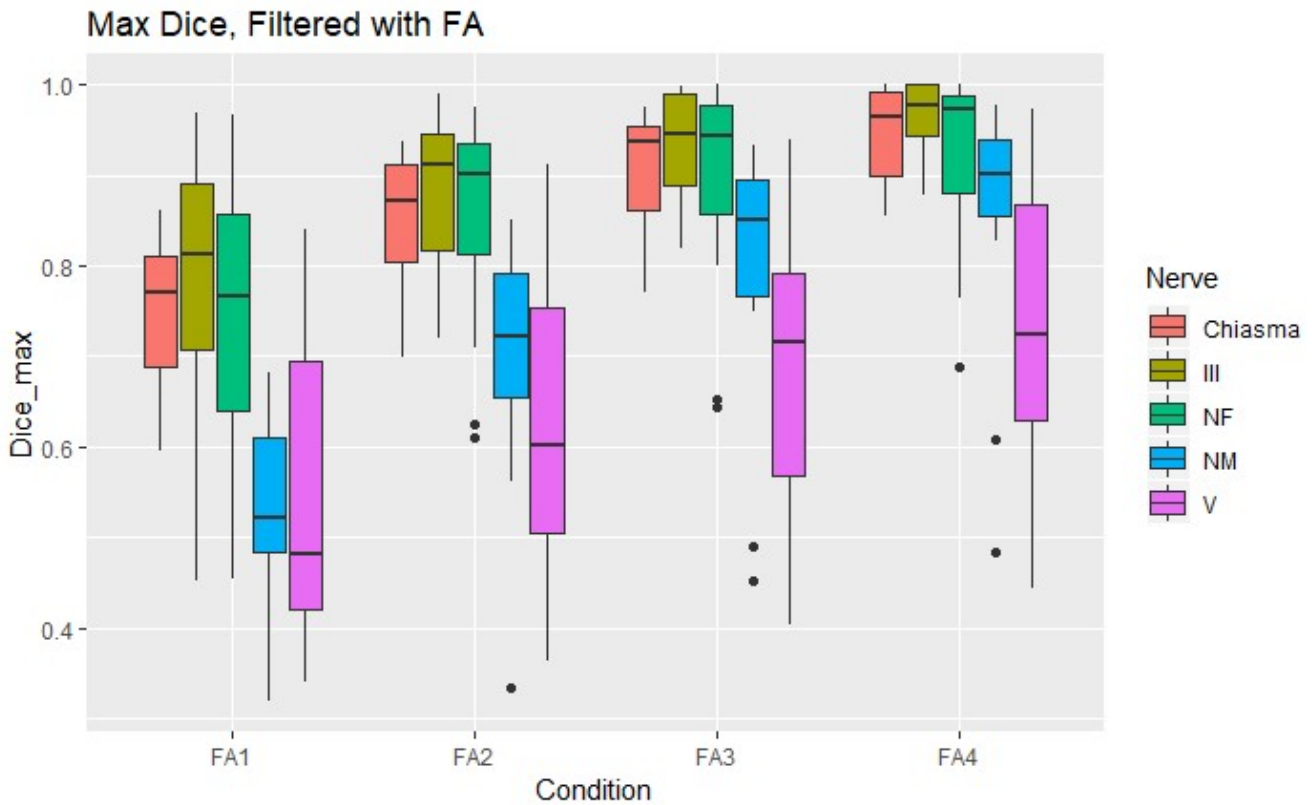
###RESULTats ##### Paramètre 1 : FA Thresh

Filtrage par FA ascendant

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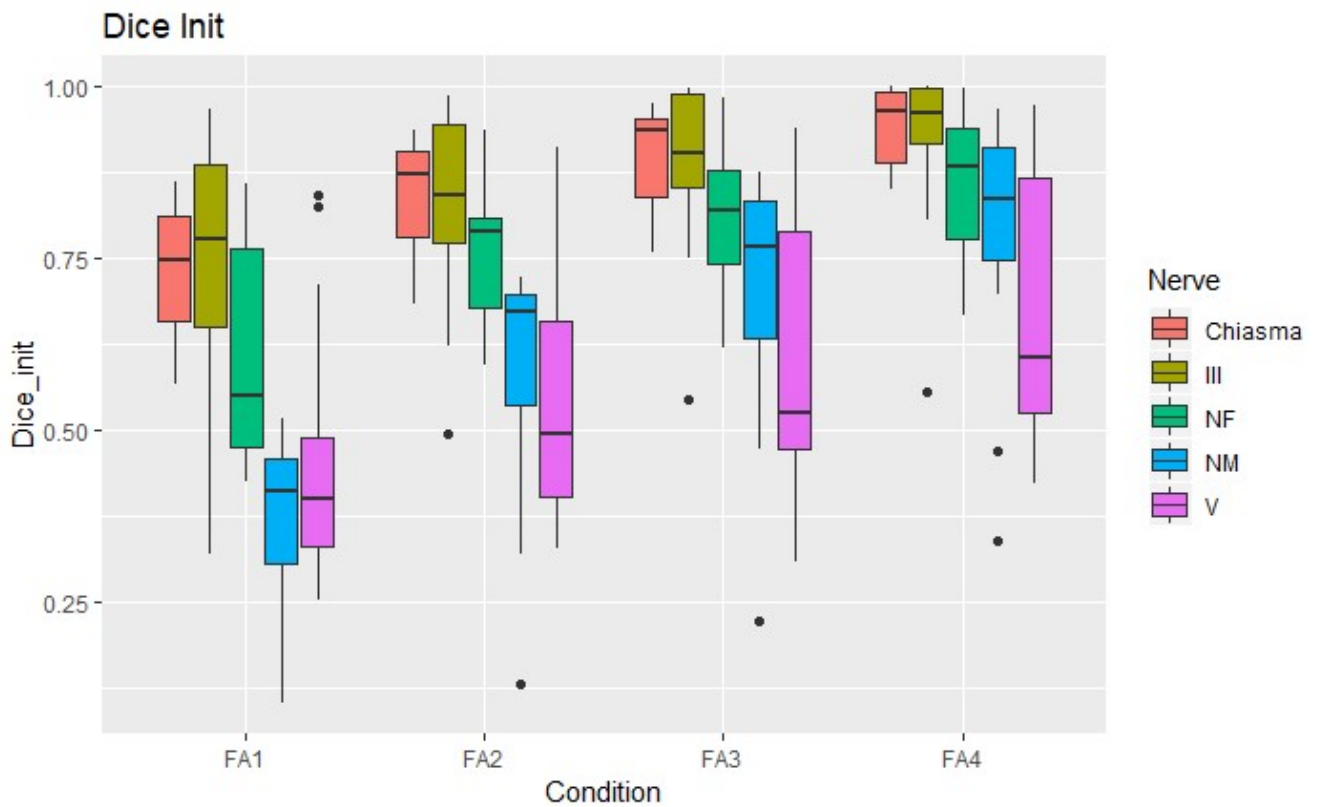
```
#Max
Table <- subset(FA_Dice_Array, Parametre == "FA", select = c("Nerve", "Condition", "Dice_max"))
# grouped boxplot
Dice_max<- Table$Dice_max
Condition<- Table$Condition
Nerve <- Table$Nerve
ggplot(Table, aes(y=Dice_max, x=Condition, fill=Nerve),title("ROI increase FA Filt
ering")) + geom_boxplot()+ggtitle("Max Dice, Filtered with FA")
```



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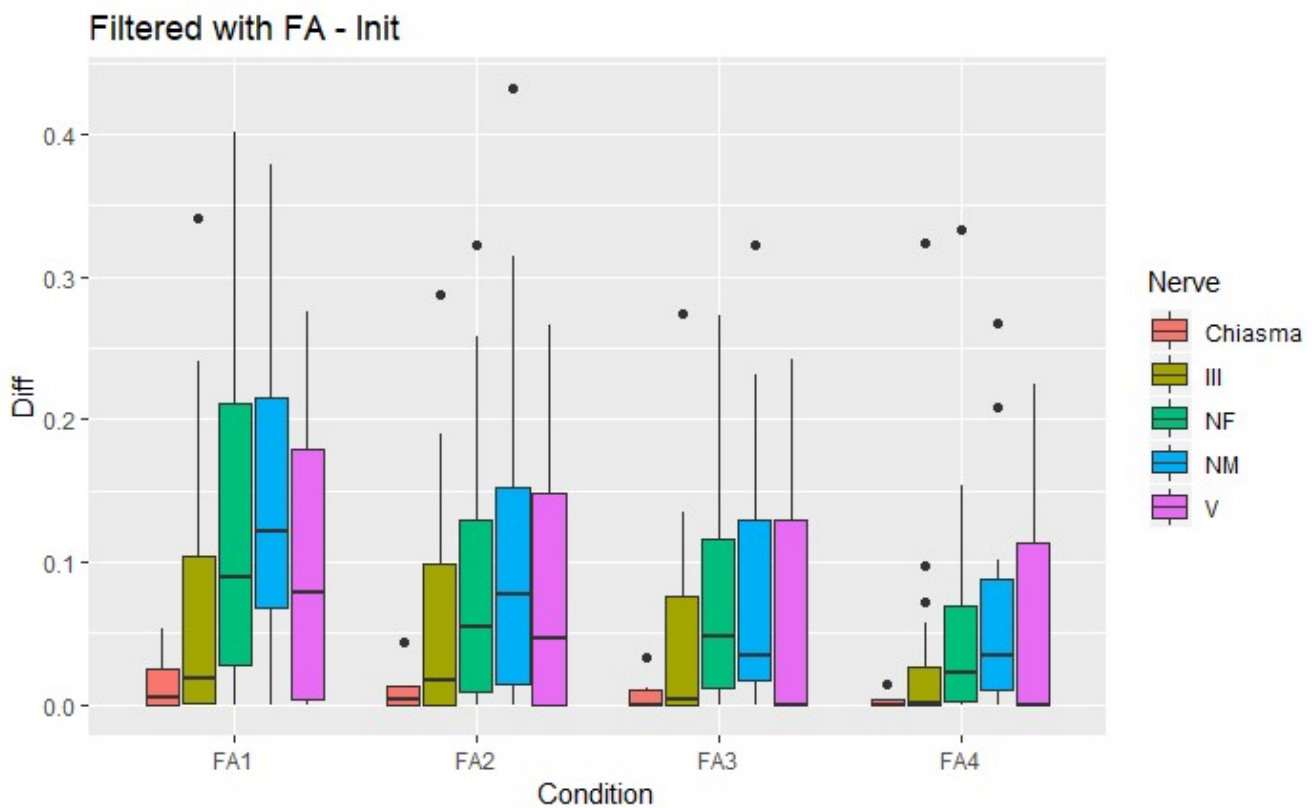
```
#Init
Table <- subset(FA_Dice_Array, Parametre == "FA", select = c("Nerve", "Condition", "Dice_init"))
# grouped boxplot
Dice_init<- Table$Dice_init
Condition<- Table$Condition
Nerve <- Table$Nerve
ggplot(Table, aes(y=Dice_init, x=Condition, fill=Nerve),title("ROI increase FA Fil
tering")) + geom_boxplot()+ggtitle("Dice Init")
```



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```
#Diff
Diff=Dice_max-Dice_init
ggplot(Table, aes(y=Diff, x=Condition, fill=Nerve),title("ROI increase FA Filterin
g")) + geom_boxplot()+ggtitle("Filtered with FA - Init")
```

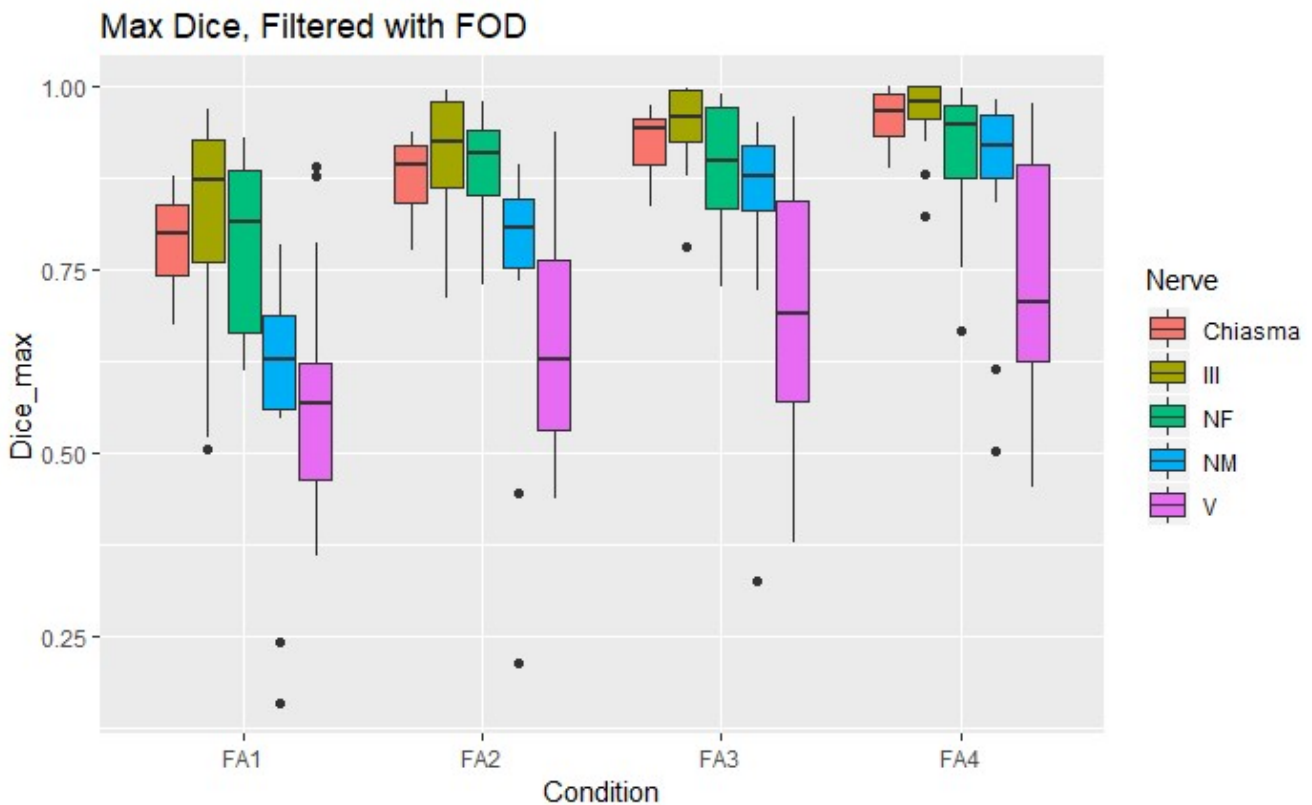


Filtrage par FOD ascendant

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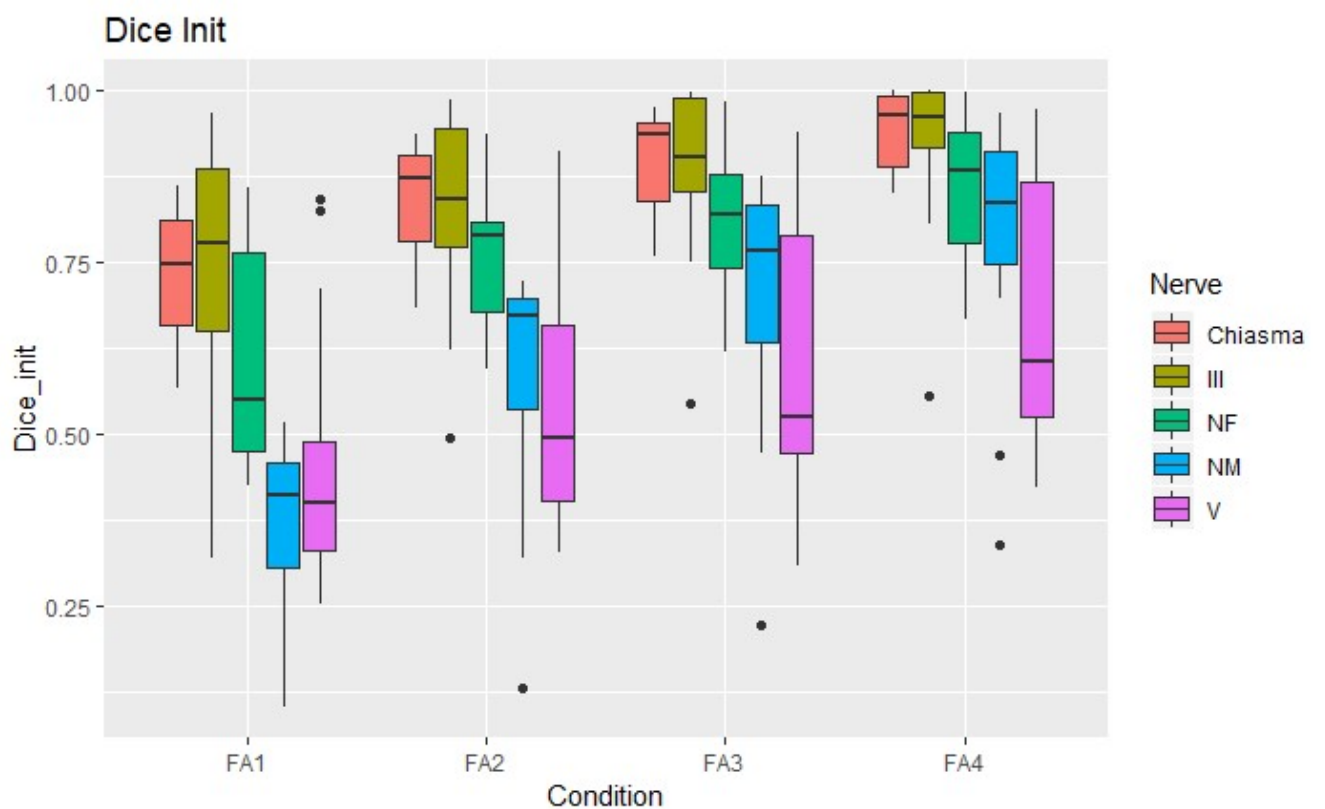
```
#Max
Table <- subset(FOD_Dice_Array, Parametre == "FA", select = c("Nerve","Condition", "Dice_max"))
# grouped boxplot
Dice_max<- Table$Dice_max
Condition<- Table$Condition
Nerve <- Table$Nerve
ggplot(Table, aes(y=Dice_max, x=Condition, fill=Nerve),title("ROI increase FA Filtering")) + geom_boxplot()+ggtitle("Max Dice, Filtered with FOD")
```



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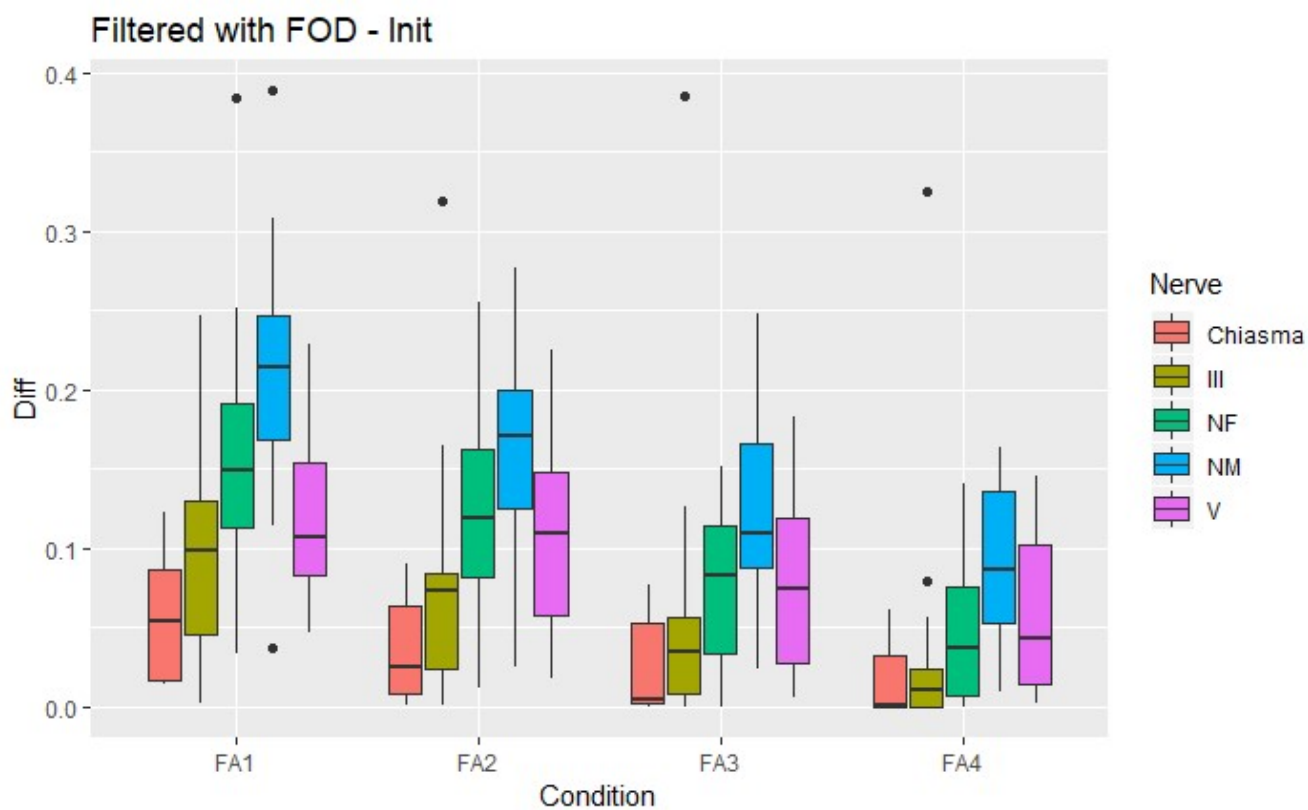
```
#Init
Table <- subset(FOD_Dice_Array, Parametre == "FA", select = c("Nerve","Condition", "Dice_init"))
# grouped boxplot
Dice_init<- Table$Dice_init
Condition<- Table$Condition
Nerve <- Table$Nerve
ggplot(Table, aes(y=Dice_init, x=Condition, fill=Nerve),title("ROI increase FA Filtering")) + geom_boxplot()+ggtitle("Dice Init")
```



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```
#Diff
Diff=Dice_max-Dice_init
ggplot(Table, aes(y=Diff, x=Condition, fill=Nerve),title("ROI increase FA Filterin
g")) + geom_boxplot()+ggtitle("Filtered with FOD - Init")
```



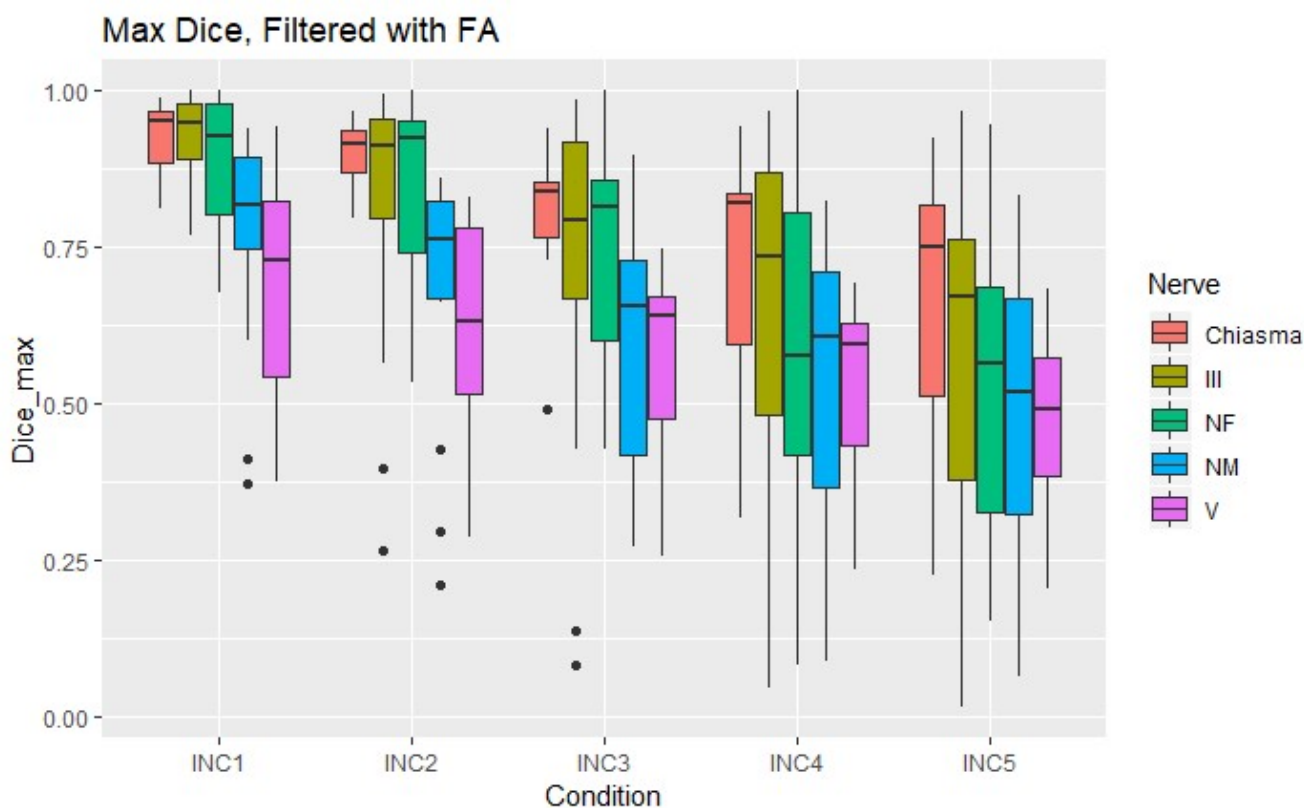
Paramètre 2 : ROI_Increase

Filtrage par FA ascendant

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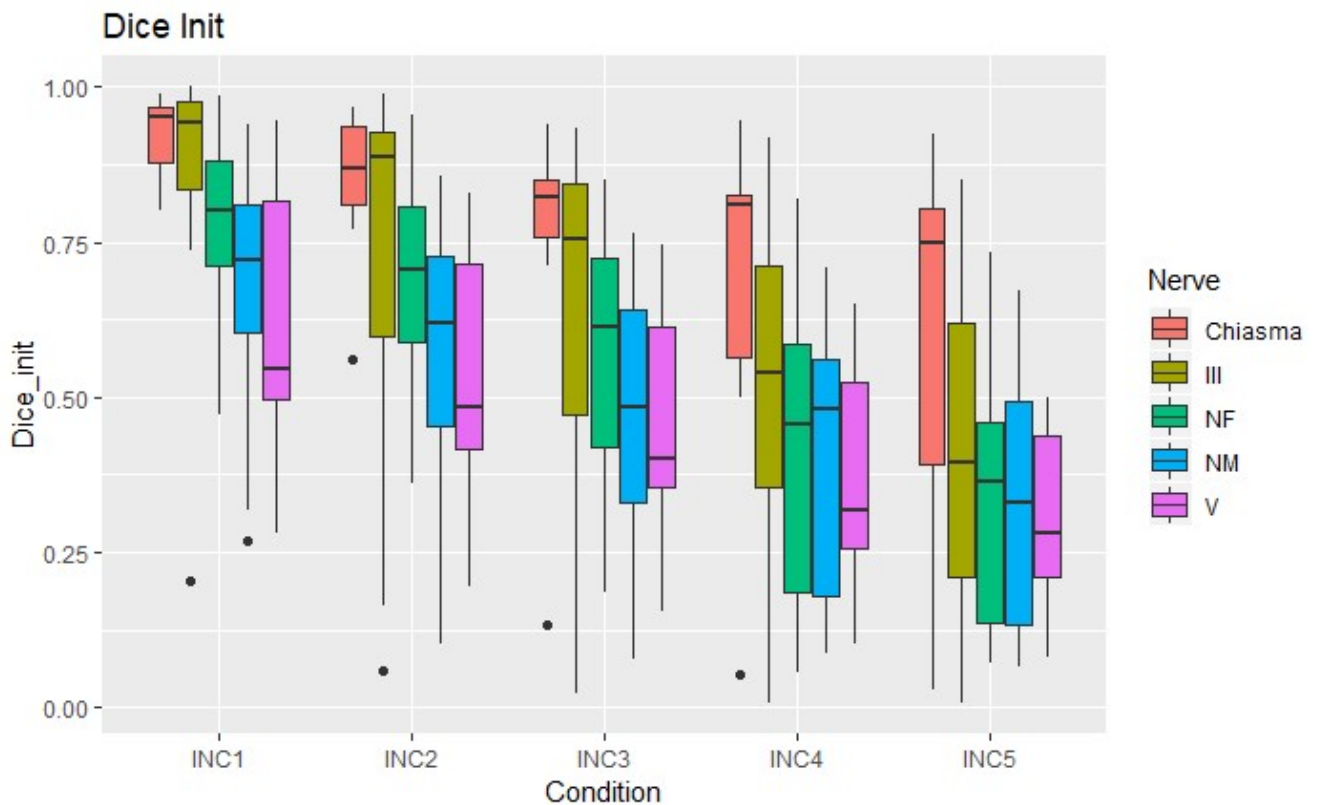
```
#Max
ROI_Increase_Dice <- subset(FA_Dice_Array, Parametre == "ROI_increase", select = c
("Nerve","Condition","Dice_max"))
# grouped boxplot
Dice_max<- ROI_Increase_Dice$Dice_max
Condition<- ROI_Increase_Dice$Condition
Nerve <- ROI_Increase_Dice$Nerve
ggplot(ROI_Increase_Dice, aes(y=Dice_max, x=Condition, fill=Nerve),title("ROI incr
ease FA Filtering")) + geom_boxplot()+ggtitle("Max Dice, Filtered with FA")
```



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```
#Init
ROI_Increase_Base <- subset(FA_Dice_Array, Parametre == "ROI_increase", select = c
("Nerve","Condition","Dice_init"))
# grouped boxplot
Dice_init<- ROI_Increase_Base$Dice_init
Condition<- ROI_Increase_Base$Condition
Nerve <- ROI_Increase_Base$Nerve
ggplot(ROI_Increase_Base, aes(y=Dice_init, x=Condition, fill=Nerve),title("ROI inc
rease FA Filtering")) + geom_boxplot()+ggtitle("Dice Init")
```



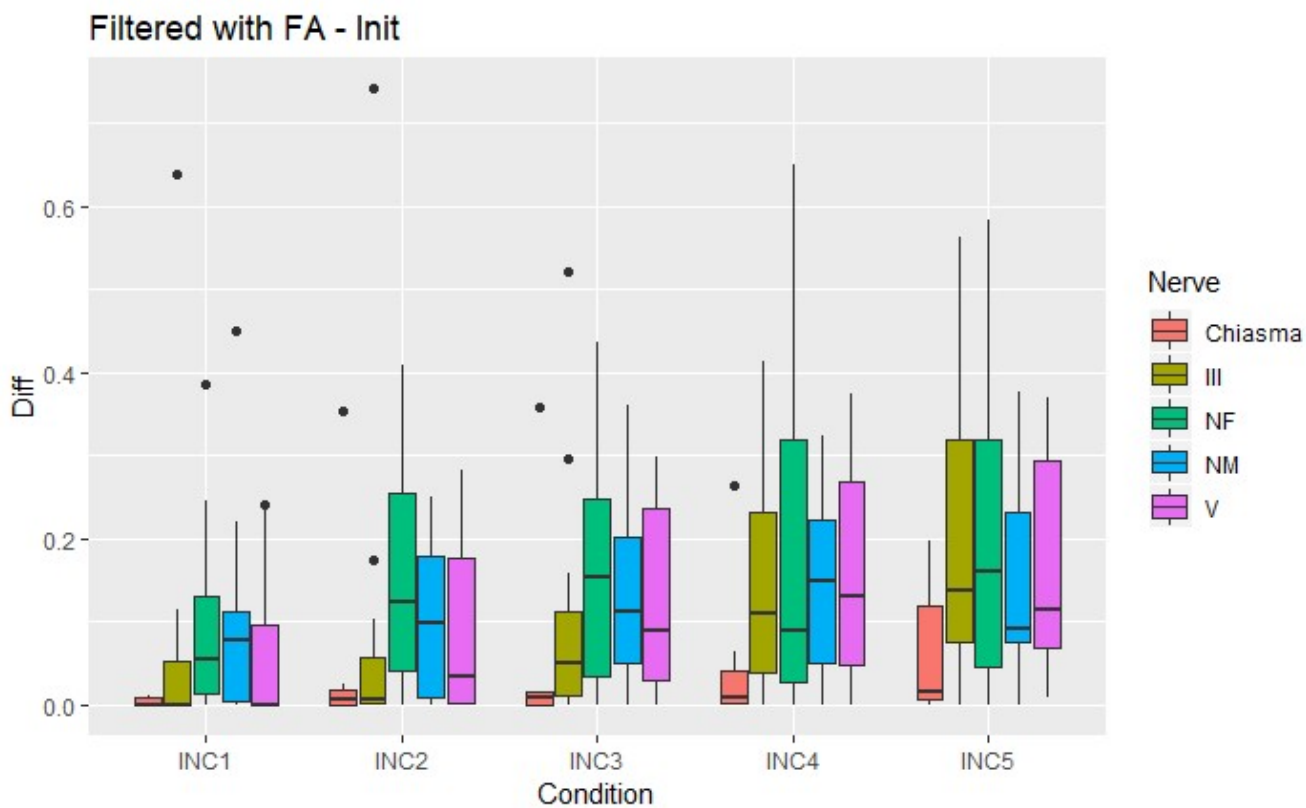
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#Diff

Diff=ROI_Increase_Dice\$Dice_max-ROI_Increase_Base\$Dice_init

```
ggplot(ROI_Increase_Base, aes(y=Diff, x=Condition, fill=Nerve), title("ROI increase  
FA Filtering")) + geom_boxplot() + ggtitle("Filtered with FA - Init")
```

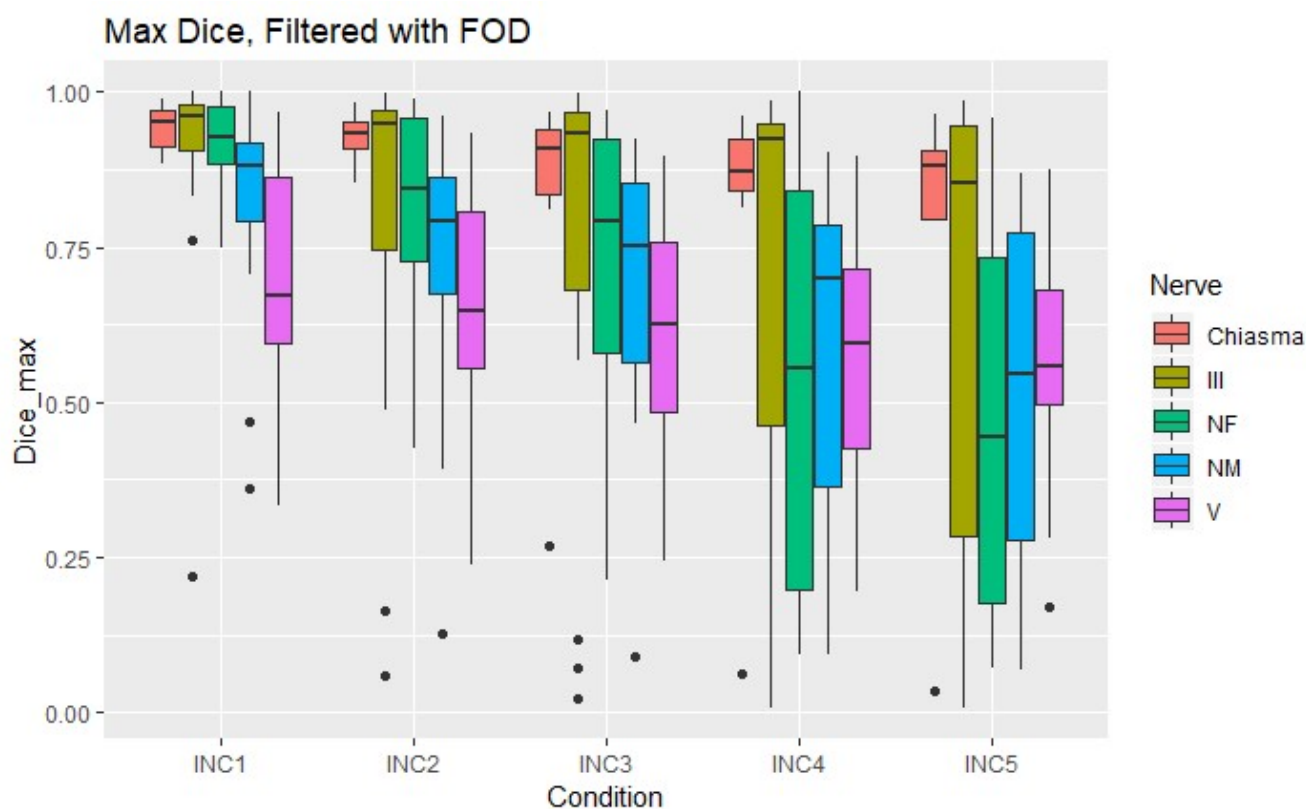


Filtrage par FOD ascendant

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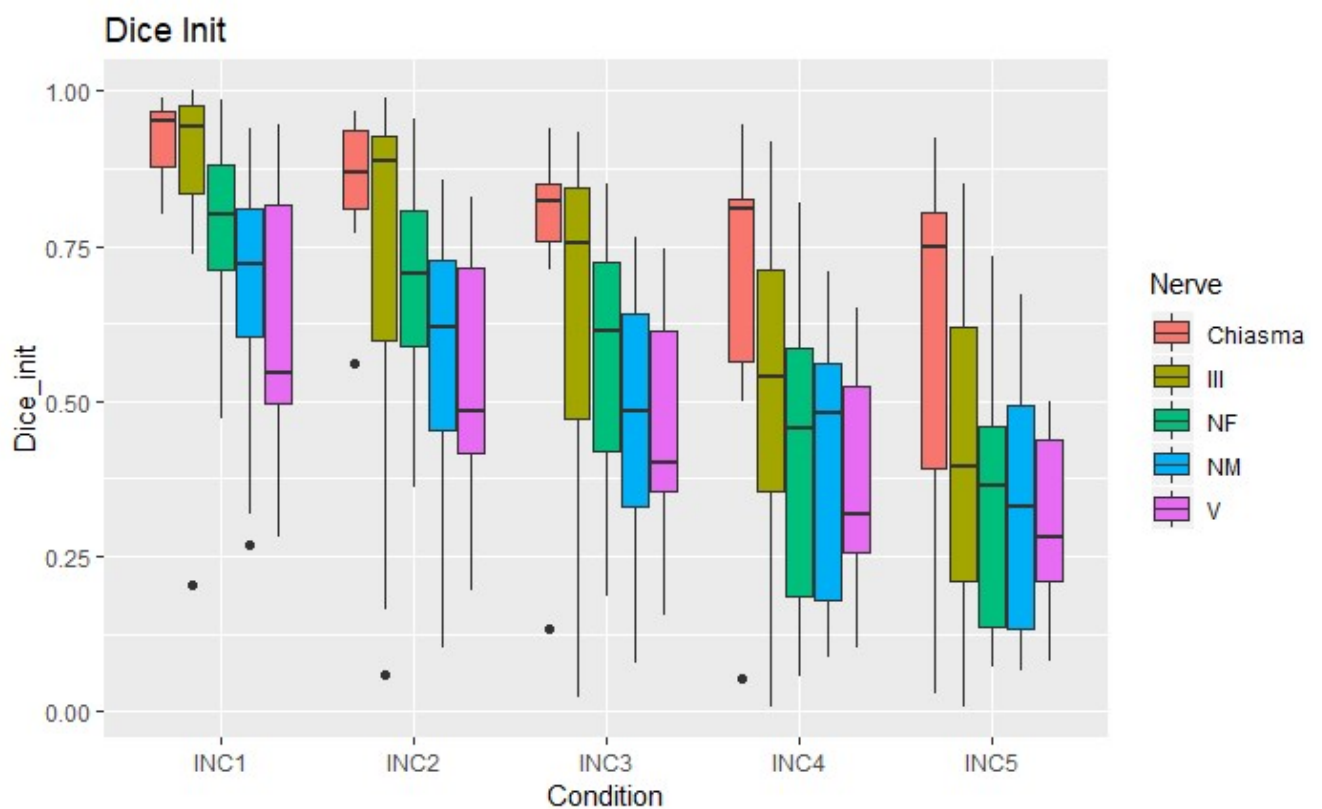
```
## FOD
#Max
ROI_Increase_Dice <- subset(FOD_Dice_Array, Parametre == "ROI_increase", select =
c("Nerve","Condition","Dice_max"))
# grouped boxplot
Dice_max<- ROI_Increase_Dice$Dice_max
Condition<- ROI_Increase_Dice$Condition
Nerve <- ROI_Increase_Dice$Nerve
ggplot(ROI_Increase_Dice, aes(y=Dice_max, x=Condition, fill=Nerve),title("ROI incr
ease FA Filtering")) + geom_boxplot()+ggtitle("Max Dice, Filtered with FOD")
```



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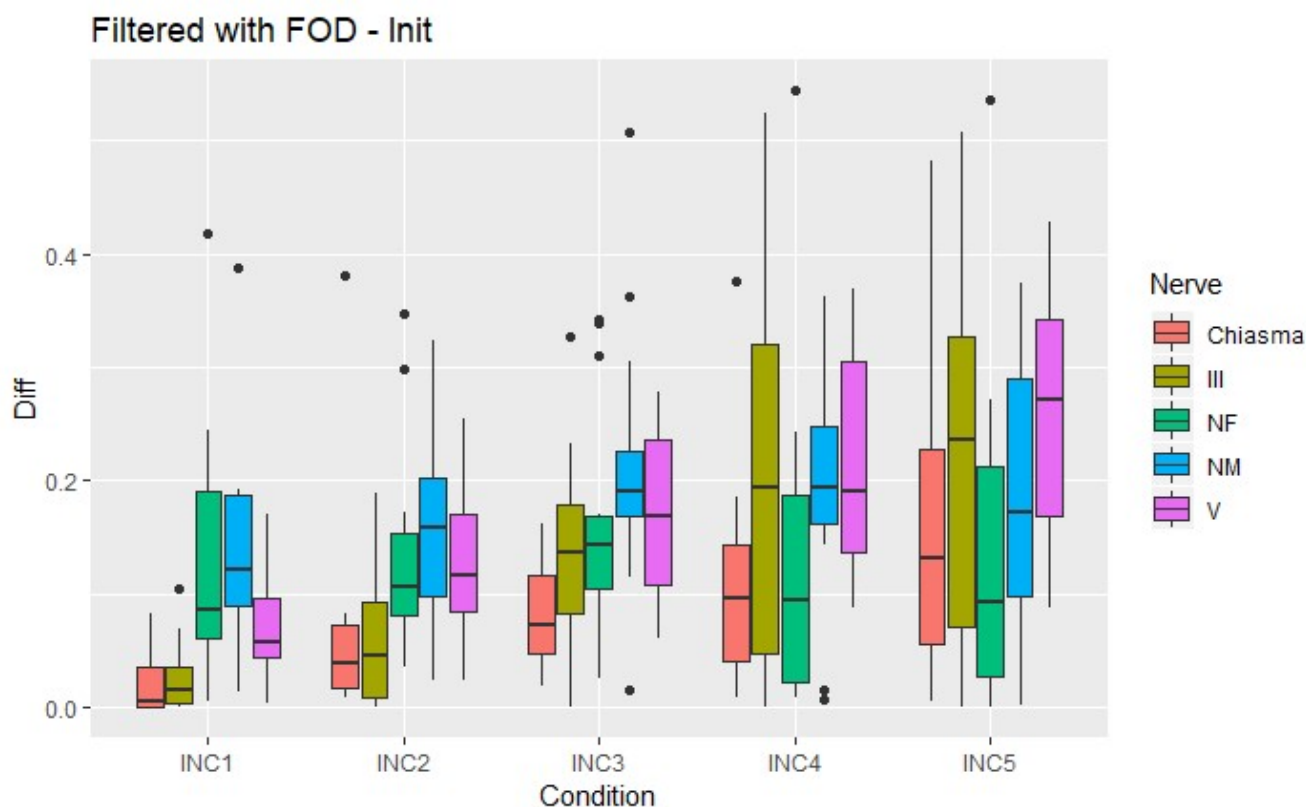
```
#Init
ROI_Increase_Base <- subset(FOD_Dice_Array, Parametre == "ROI_increase", select =
c("Nerve","Condition","Dice_init"))
# grouped boxplot
Dice_init<- ROI_Increase_Base$Dice_init
Condition<- ROI_Increase_Base$Condition
Nerve <- ROI_Increase_Base$Nerve
ggplot(ROI_Increase_Base, aes(y=Dice_init, x=Condition, fill=Nerve),title("ROI inc
rease FA Filtering")) + geom_boxplot()+ggtitle("Dice Init")
```



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```
#Diff
Diff=ROI_Increase_Dice$Dice_max-ROI_Increase_Base$Dice_init
ggplot(ROI_Increase_Base, aes(y=Diff, x=Condition, fill=Nerve),title("ROI increase
FA Filtering")) + geom_boxplot()+ggtitle("Filtered with FOD - Init")
```



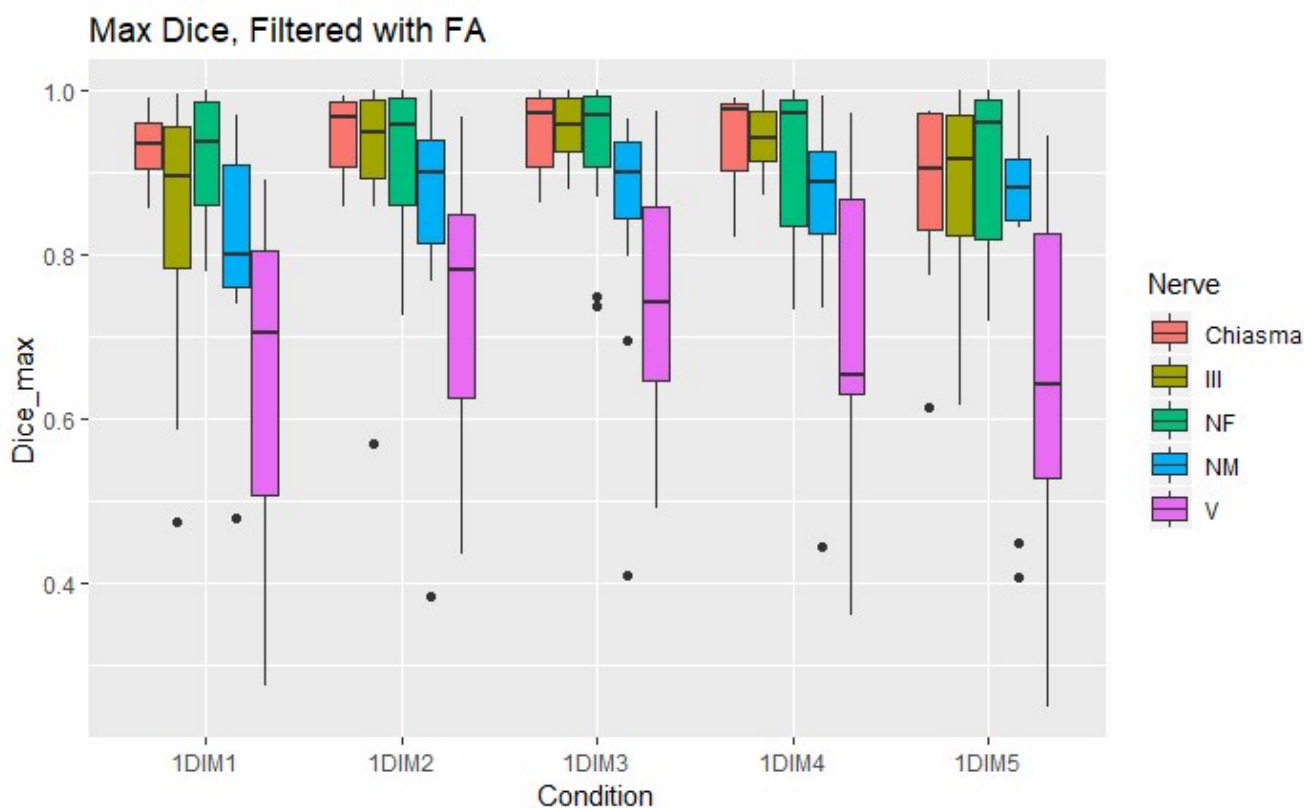
Paramètre 3 : ROI_moveLat

Filtrage par FA ascendant

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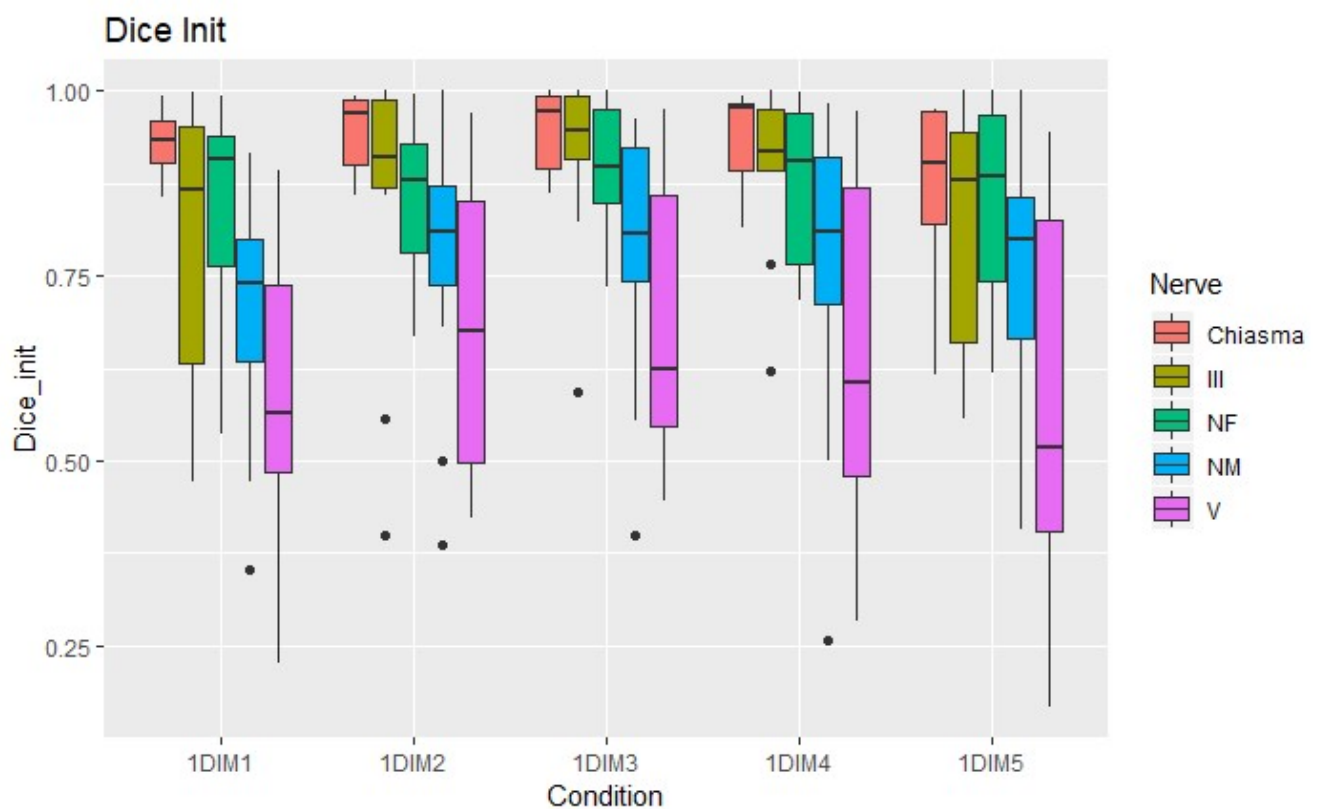
```
#Max
Table <- subset(FA_Dice_Array, Parametre == "ROI_moveLat", select = c("Nerve","Condition","Dice_max"))
# grouped boxplot
Dice_max<- Table$Dice_max
Condition<- Table$Condition
Nerve <- Table$Nerve
ggplot(Table, aes(y=Dice_max, x=Condition, fill=Nerve),title("ROI increase FA Filtering")) + geom_boxplot()+ggtitle("Max Dice, Filtered with FA")
```



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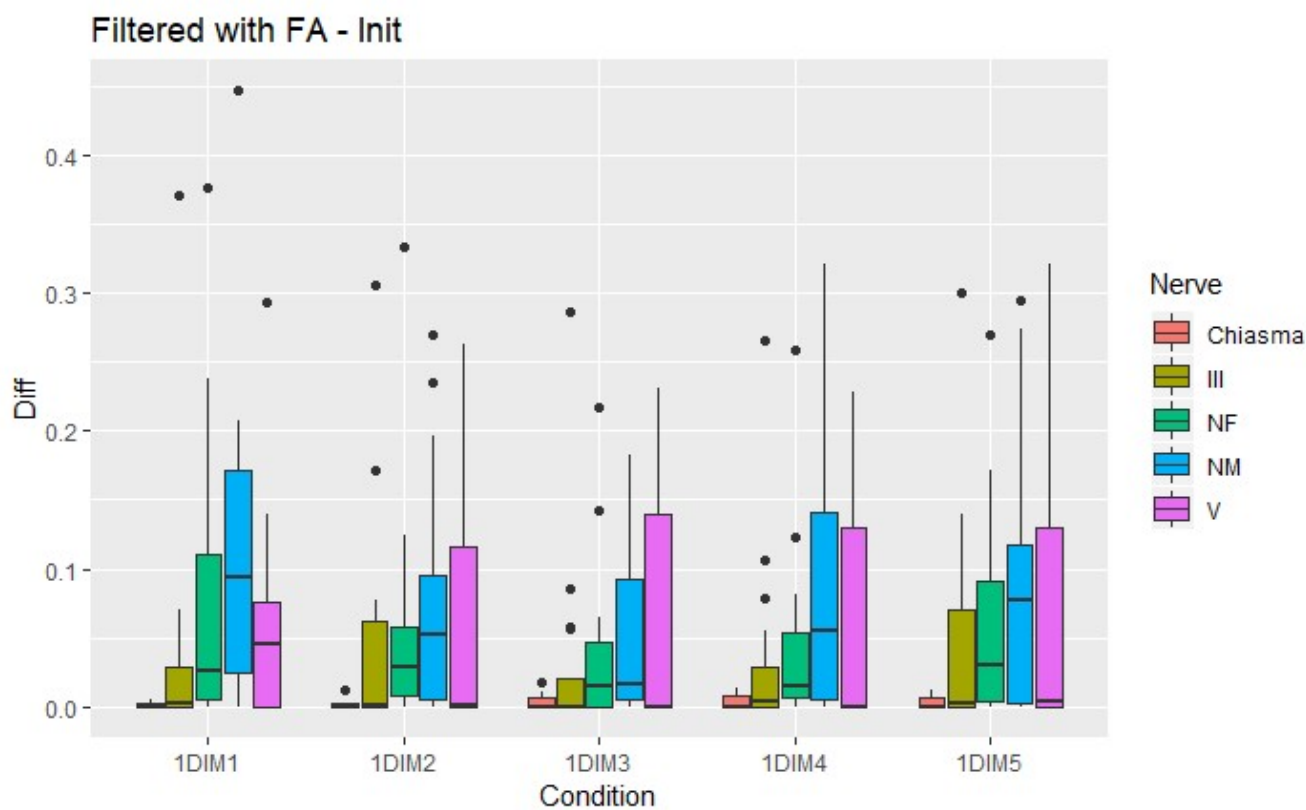
```
#Init
Table <- subset(FA_Dice_Array, Parametre == "ROI_moveLat", select = c("Nerve","Condition","Dice_init"))
# grouped boxplot
Dice_init<- Table$Dice_init
Condition<- Table$Condition
Nerve <- Table$Nerve
ggplot(Table, aes(y=Dice_init, x=Condition, fill=Nerve),title("ROI increase FA Filtering")) + geom_boxplot()+ggtitle("Dice Init")
```



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```
#Diff
Diff=Dice_max-Dice_init
ggplot(Table, aes(y=Diff, x=Condition, fill=Nerve),title("ROI increase FA Filterin
g")) + geom_boxplot()+ggtitle("Filtered with FA - Init")
```

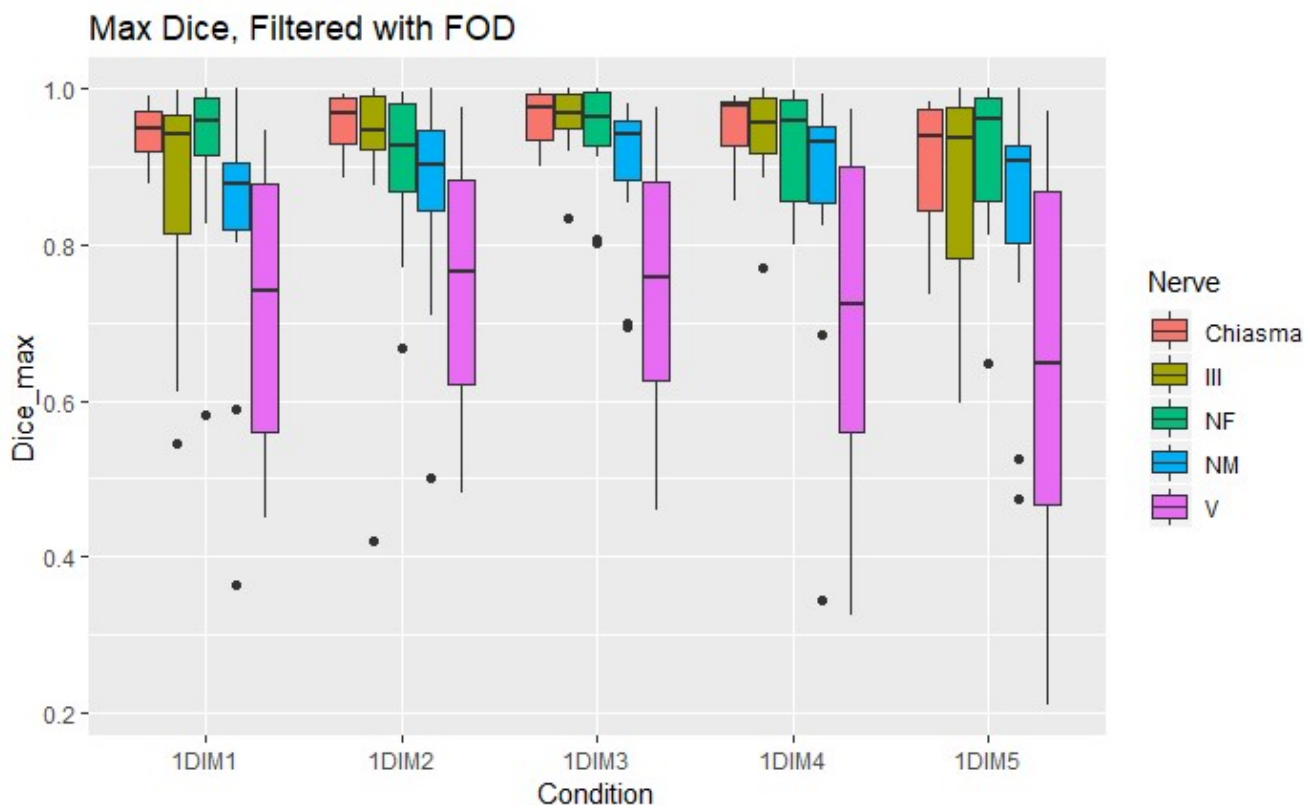


Fltrage par FOD ascendant

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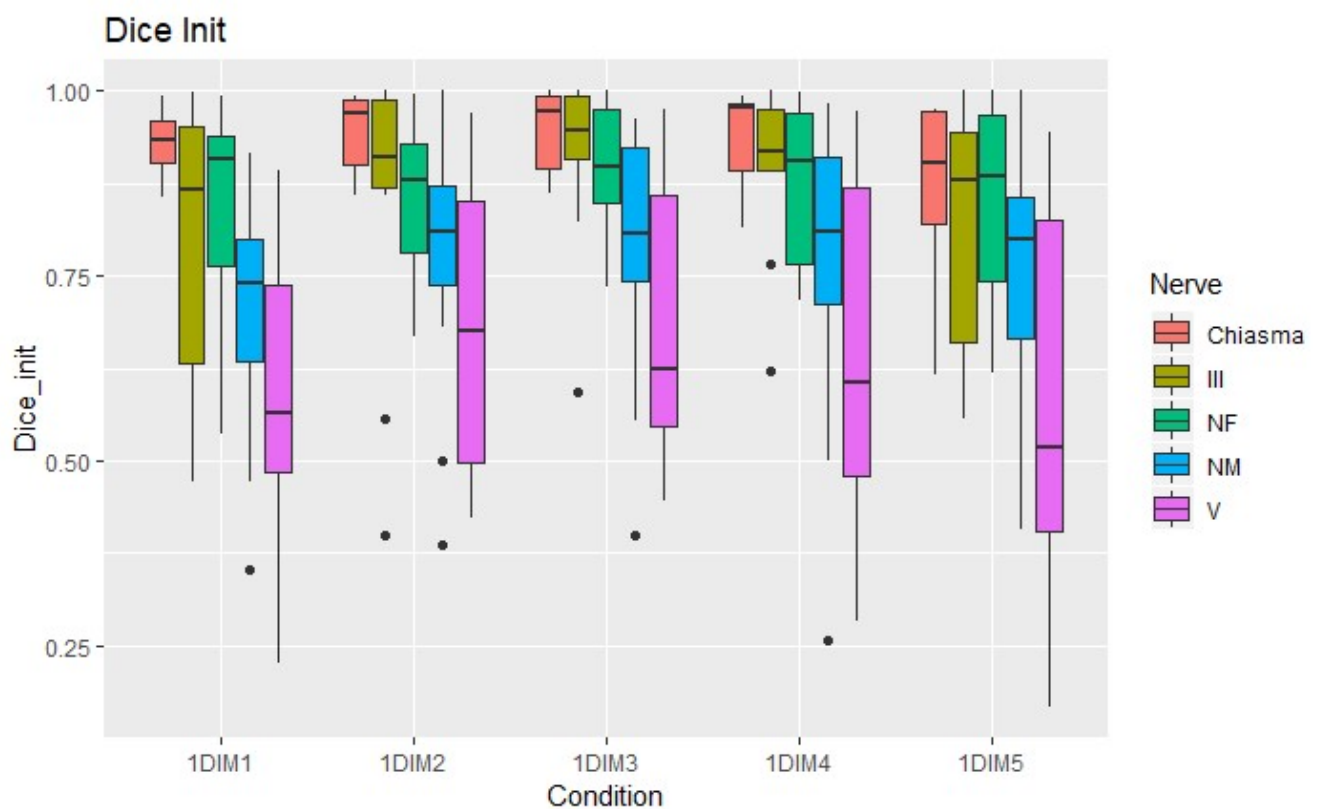
```
#Max
Table <- subset(FOD_Dice_Array, Parametre == "ROI_moveLat", select = c("Nerve", "Condition", "Dice_max"))
# grouped boxplot
Dice_max<- Table$Dice_max
Condition<- Table$Condition
Nerve <- Table$Nerve
ggplot(Table, aes(y=Dice_max, x=Condition, fill=Nerve),title("ROI increase FA Filtering")) + geom_boxplot()+ggtitle("Max Dice, Filtered with FOD")
```



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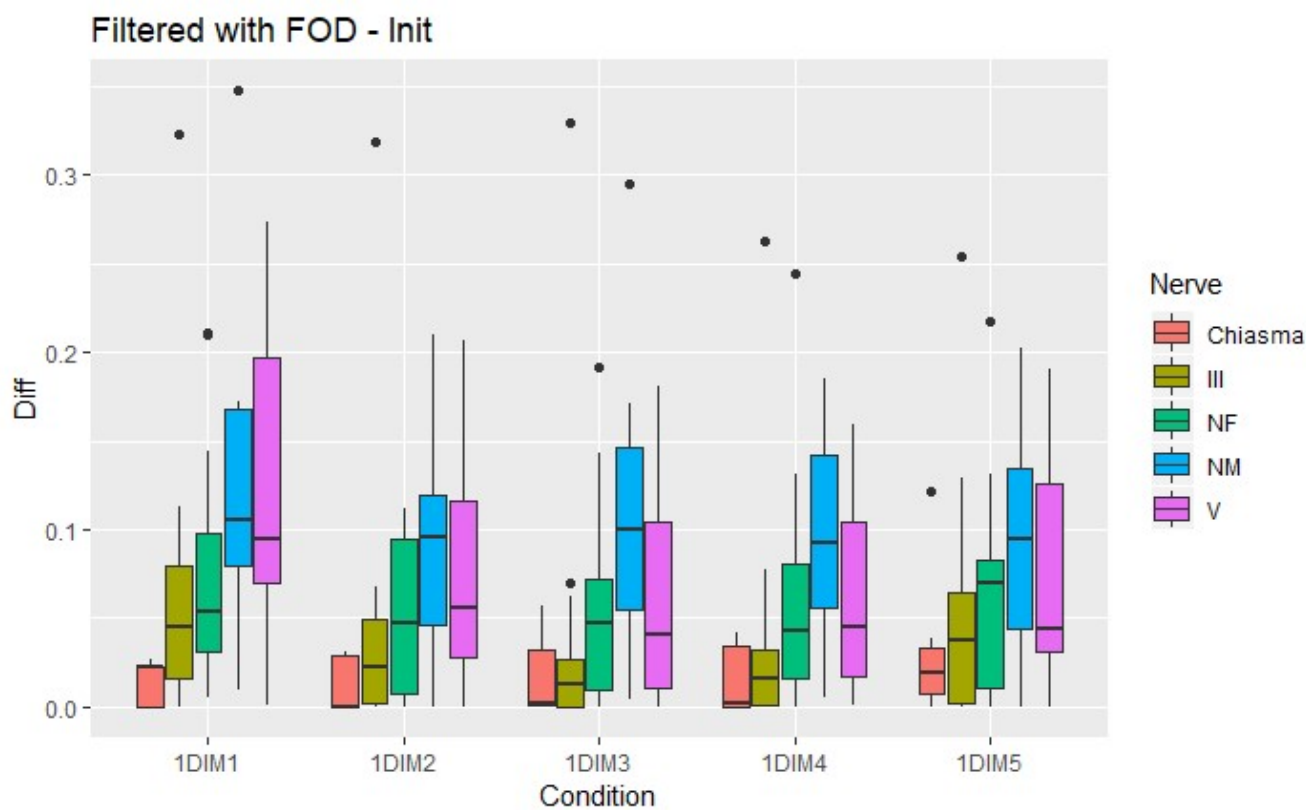
```
#Init
Table <- subset(FOD_Dice_Array, Parametre == "ROI_moveLat", select = c("Nerve", "Condition", "Dice_init"))
# grouped boxplot
Dice_init<- Table$Dice_init
Condition<- Table$Condition
Nerve <- Table$Nerve
ggplot(Table, aes(y=Dice_init, x=Condition, fill=Nerve),title("ROI increase FA Filtering")) + geom_boxplot()+ggtitle("Dice Init")
```

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```
#Diff
Diff=Dice_max-Dice_init
ggplot(Table, aes(y=Diff, x=Condition, fill=Nerve),title("ROI increase FA Filterin
g")) + geom_boxplot()+ggtitle("Filtered with FOD - Init")
```



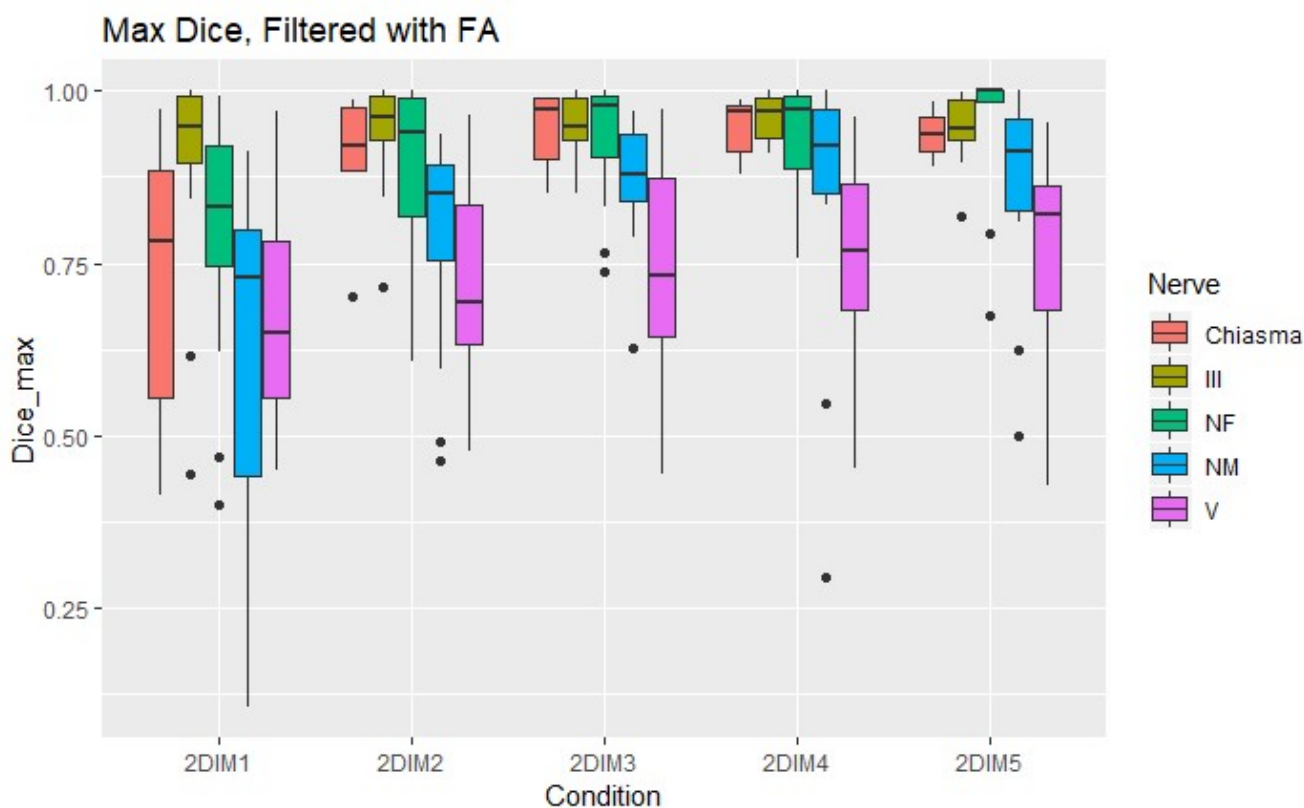
Paramètre 4 : ROI_movePos

Filtrage par FA ascendant

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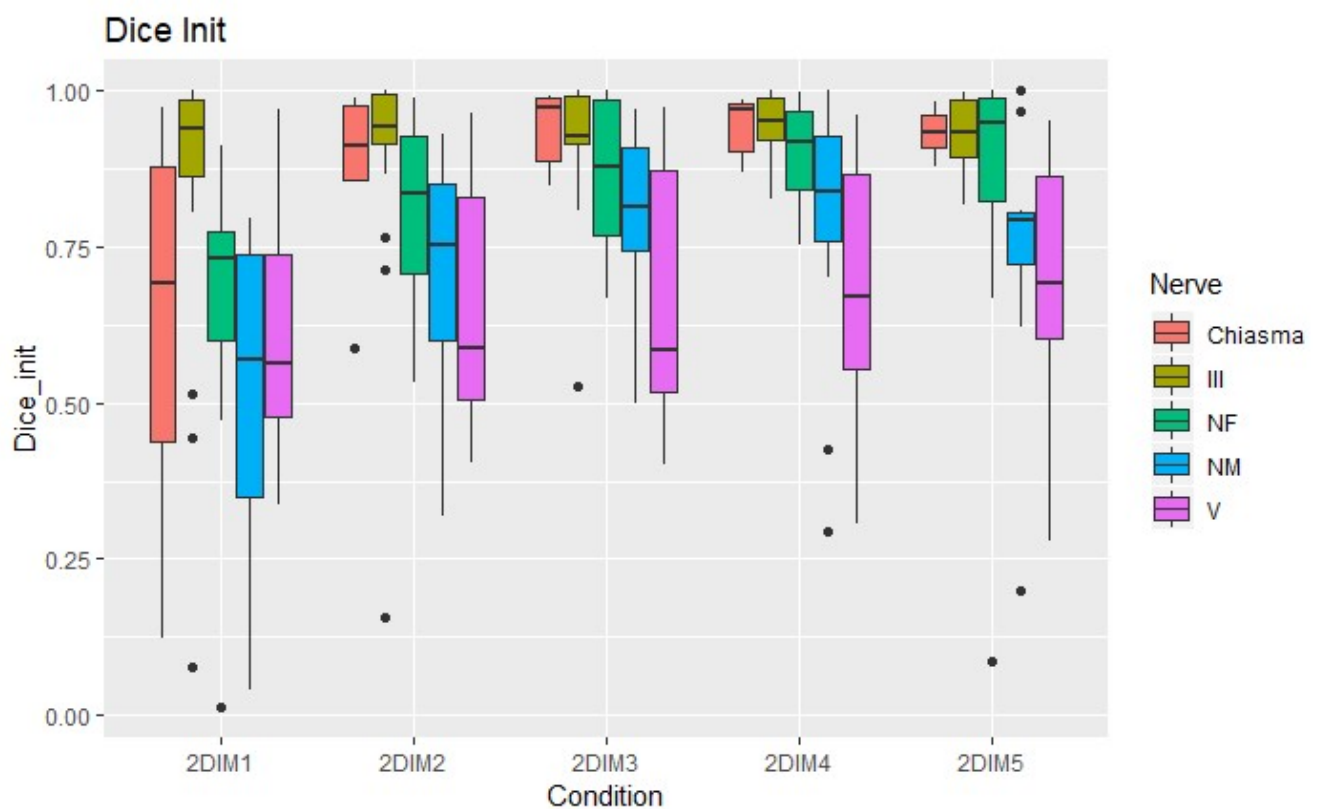
```
#Max
Table <- subset(FA_Dice_Array, Parametre == "ROI_movePos", select = c("Nerve","Condition","Dice_max"))
# grouped boxplot
Dice_max<- Table$Dice_max
Condition<- Table$Condition
Nerve <- Table$Nerve
ggplot(Table, aes(y=Dice_max, x=Condition, fill=Nerve),title("ROI increase FA Filtering")) + geom_boxplot()+ggtitle("Max Dice, Filtered with FA")
```



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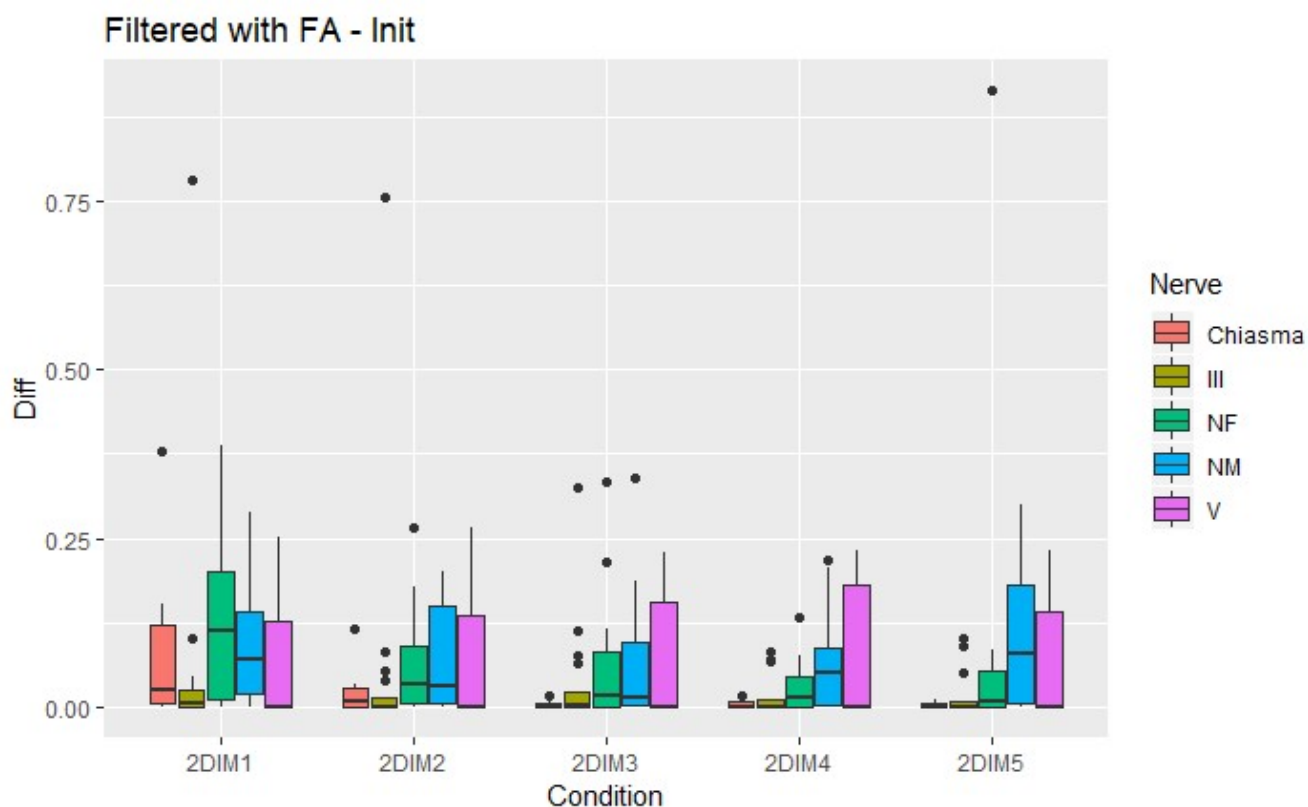
```
#Init
Table <- subset(FA_Dice_Array, Parametre == "ROI_movePos", select = c("Nerve","Condition","Dice_init"))
# grouped boxplot
Dice_init<- Table$Dice_init
Condition<- Table$Condition
Nerve <- Table$Nerve
ggplot(Table, aes(y=Dice_init, x=Condition, fill=Nerve),title("ROI increase FA Filtering")) + geom_boxplot()+ggtitle("Dice Init")
```



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```
#Diff
Diff=Dice_max-Dice_init
ggplot(Table, aes(y=Diff, x=Condition, fill=Nerve),title("ROI increase FA Filterin
g")) + geom_boxplot()+ggtitle("Filtered with FA - Init")
```

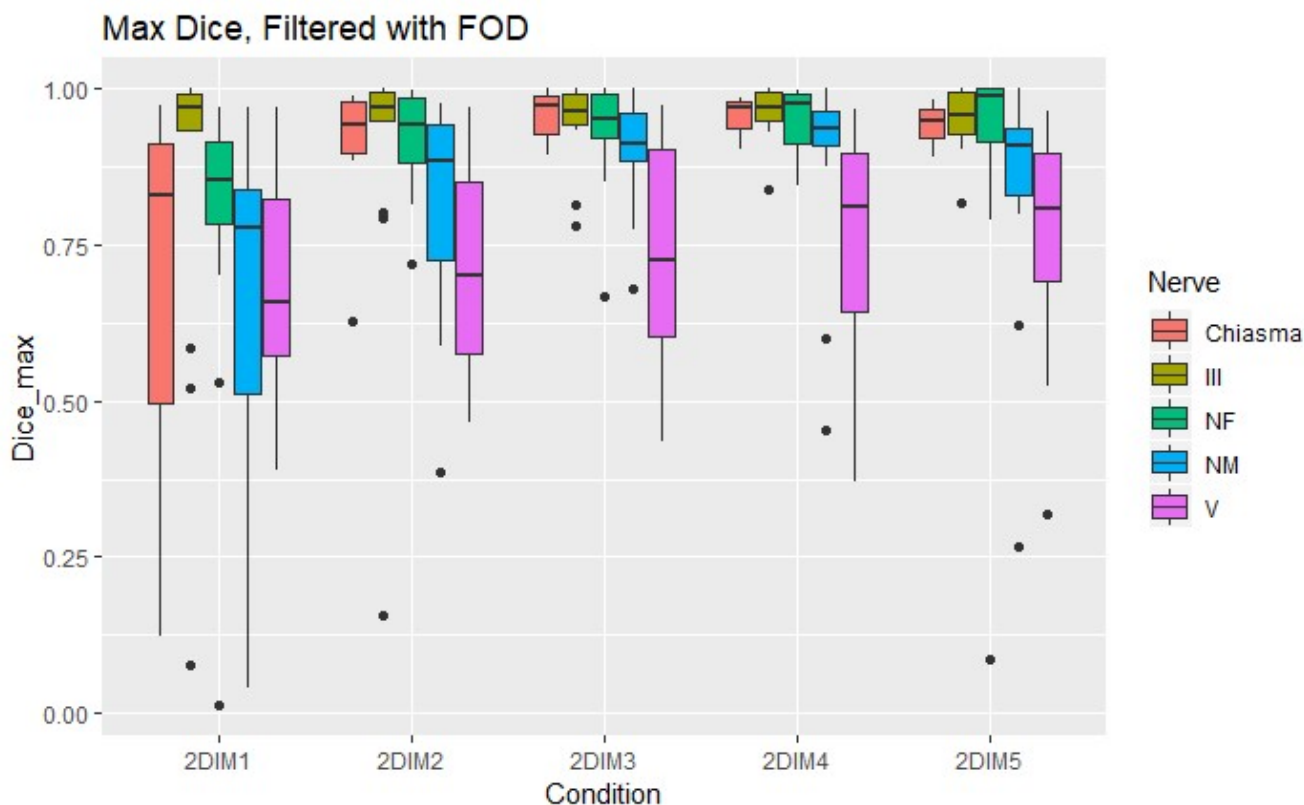


Filtrage par FOD ascendant

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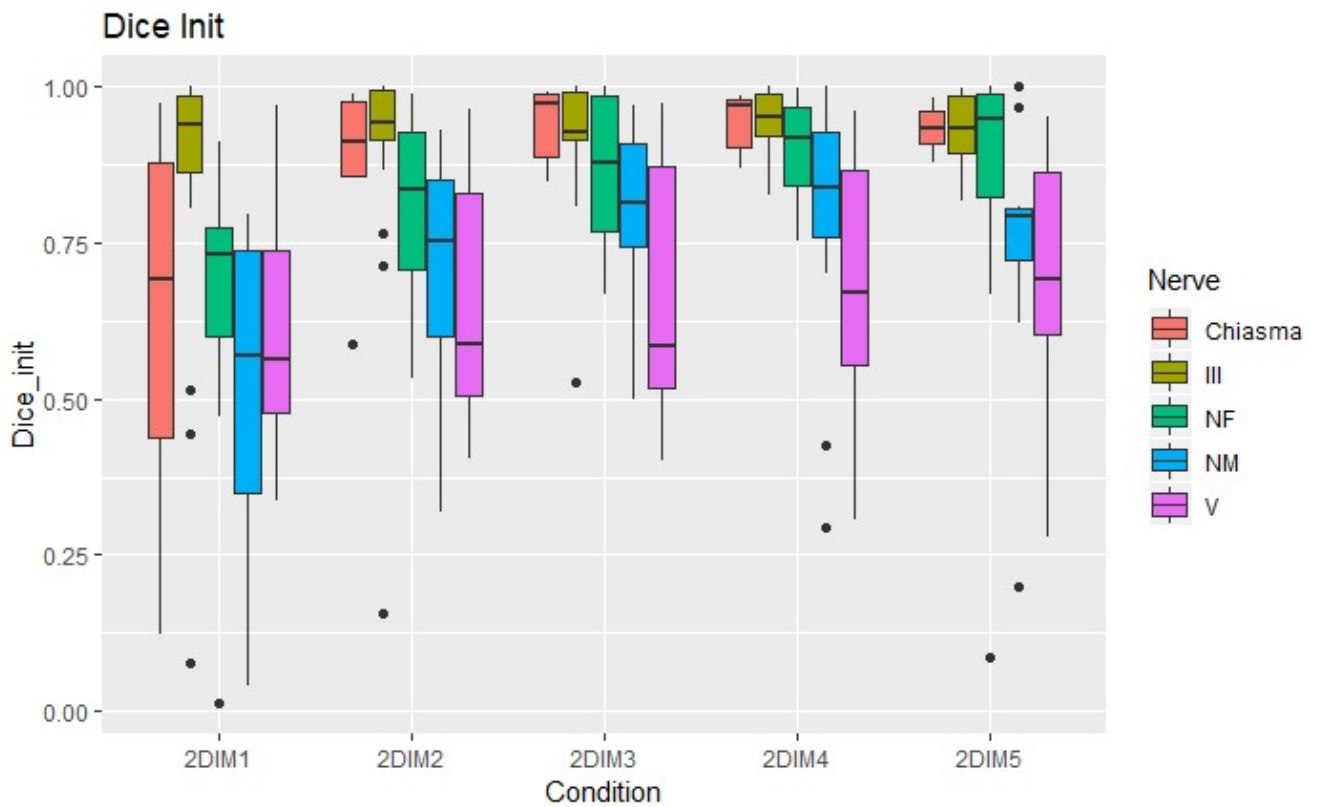
```
#Max
Table <- subset(FOD_Dice_Array, Parametre == "ROI_movePos", select = c("Nerve", "Condition", "Dice_max"))
# grouped boxplot
Dice_max<- Table$Dice_max
Condition<- Table$Condition
Nerve <- Table$Nerve
ggplot(Table, aes(y=Dice_max, x=Condition, fill=Nerve),title("ROI increase FA Filtering")) + geom_boxplot()+ggtitle("Max Dice, Filtered with FOD")
```



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```
#Init
Table <- subset(FOD_Dice_Array, Parametre == "ROI_movePos", select = c("Nerve", "Condition", "Dice_init"))
# grouped boxplot
Dice_init<- Table$Dice_init
Condition<- Table$Condition
Nerve <- Table$Nerve
ggplot(Table, aes(y=Dice_init, x=Condition, fill=Nerve),title("ROI increase FA Filtering")) + geom_boxplot()+ggtitle("Dice Init")
```



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```
#Diff
Diff=Dice_max-Dice_init
ggplot(Table, aes(y=Diff, x=Condition, fill=Nerve),title("ROI increase FA Filterin
g")) + geom_boxplot()+ggtitle("Filtered with FOD - Init")
```

