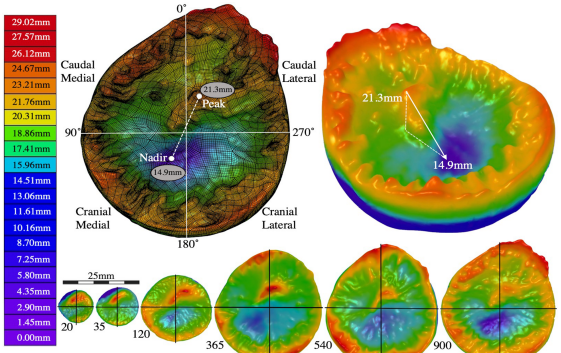
Tubercle Height & Slope

Age [Days]	Height [mm]	Secant[°]	Difference
120 1R	5.80	23.28	
120 2R	3.93	16.25	
120 3R	5.10	24.68	
120 4R	7.05	28.60	
1201L	4.52	18.52	
120 2L	4.98	17.53	
120 3L	6.52	25.61	
120 4L	6.22	24.66	
Mean	5.52	22.39	
SD	1.06	4.41	
Age [Days]	Height [mm]	Secant[°]	
900 1R	8.69	31.50	
900 2R	6.43	24.39	
900 3R	8.31	31.22	
9001L	6.89	29.16	
900 2L	8.32	29.06	
900 3L	8.92	32.81	
Mean	7.93	29.69	
SD	1.02	2.97	



Tubercle Height 120 to 900 Days

Test for normality 120 Days

Descriptive Statistics

	Height [mm]		Height [mm]
Mean	5.52	Min	3.93
Standard Erro	0.37571836	Q1-Min	0.935
Median	5.45	Med-Q1	0.585
Mode	#N/A	Q3-Med	0.845
Standard Devi	1.062692	Max-Q3	0.755
Sample Variar	1.12931429	Mean	5.52
Kurtosis	-1.0748773		
Skewness	-0.0295405	Min	3.93
Range	3.12	Q1	4.865
Maximum	7.05	Median	5.45
Minimum	3.93	Q3	6.295
Sum	44.12	Max	7.05
Count	8	Mean	5.52
Geometric Me	5.42310733		
Harmonic Me	5.32986107	Grand Min	0
AAD	0.8825		
MAD	0.85	Outliers	None
IQR	1.43		

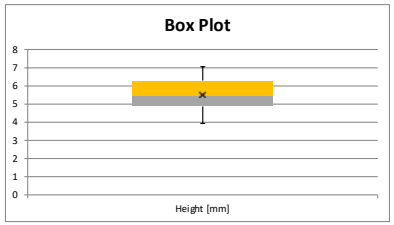
Box Plot 2.2

Shapiro-Wilk Test

	Height [mm]
W-stat	0.97557573
p-value	0.93780872
alpha	0.05
normal	yes

d'Agostino-Pearson

DA-stat	0.52838154
p-value	0.76782705
alpha	0.05
normal	yes



Freedman-Diaconis Rule for bin width
1.43

Test for normality 900 Days

Descriptive Statistics

	Height [mm]		Height [mm]
Mean	7.93	Min	6.43
Standard Erro	0.41576168	Q1-Min	0.815
Median	8.32	Med-Q1	1.07
Mode	#N/A	Q3-Med	0.2825
Standard Devi	1.01840398	Max-Q3	0.3225
Sample Variar	1.03714667	Mean	7.93
Kurtosis	-1.3490173		
Skewness	-0.8306511	Min	6.43
Range	2.49	Q1	7.245
Maximum	8.92	Median	8.32
Minimum	6.43	Q3	8.5975
Sum	47.56	Max	8.92
Count	6	Mean	7.93
Geometric Me	7.86906615		
Harmonic Me	7.80873239	Grand Min	0
AAD	0.84444444		
MAD	0.49	Outliers	None
IQR	1.3525		

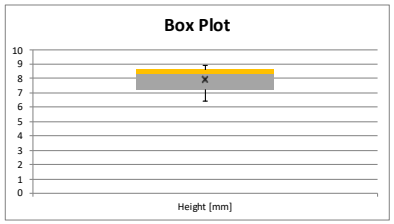
Box Plot 2.2

Shapiro-Wilk Test

	Height [mm]
W-stat	0.8562217
p-value	0.17657569
alpha	0.05
normal	yes

d'Agostino-Pearson

DA-stat	1.56652341
p-value	0.45691326
alpha	0.05
normal	yes



Tubercle Height 120 to 900 Days

T Test: Two Independent Samples

SUMMARY — Hyp Mean D: 0

Groups	Count	Mean	Variance	Cohen d
Height [mm]	6	7.93	1.03714667	
Height [mm]	8	5.52	1.12931429	
Pooled		2.41	1.09091111	2.3089929

Effect size	Effect size
Choen's *d* score	Choen's *r* score
0.2 Small	0.1 Small
0.5 Medium	0.3 Medium
0.8 Large	0.5 Large

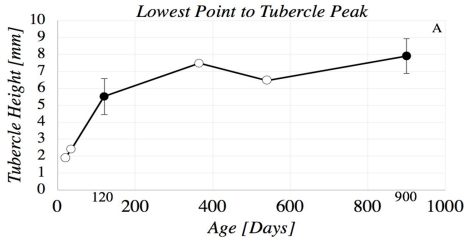
T TEST: Equal Variances — Alpha 0.05

	std err	t-stat	df	p-value	t-crit	lower	upper	sig	effect r
One Tail	0.5640766	4.27542408	12	0.00053885	1.78228756			yes	0.77697427
Two Tail	0.5640766	4.27542408	12	0.0010777	2.17881283	1.18264934	3.64068399	yes	0.77697427

T TEST: Unequal Variances — Alpha 0.05

	std err	t-stat	df	p-value	t-crit	lower	upper	sig	effect r
One Tail	0.56037672	4.30365252	11.1767997	0.00060194	1.79328875			yes	0.78971785
Two Tail	0.56037672	4.30365252	11.1767997	0.00120387	2.19674482	1.18066202	3.64267131	yes	0.78971785

Average tubercle height increased from 120-days-old (5.52 ± 1.06 mm) to 900-days-old (7.93 ± 1.02 mm)
This difference (2.41 mm), 95% CI [1.18, 3.64] was statistically significant$t(11.18) = 4.30$, $P = .001$, with a large effect size($d = 2.31$).
the tubercle height at 900 days was 2.41mm greater than at 120 days… add statistics and mean SD. And ttest used



Tubercle rate of change (slope) 120 to 900 Days

Test For Normality 120 Days

Descriptive Statistics

	Secant[°]
Mean	22.39
Standard Erro	1.56
Median	23.97
Mode	#N/A
Standard Devi	4.4145488
Sample Variar	19.4882411
Kurtosis	-1.42
Skewness	-0.24
Range	12.35
Maximum	28.60
Minimum	16.25
Sum	179.13
Count	8
Geometric Me	21.9936158
Harmonic Mea	21.5856287
AAD	3.7184375
MAD	3.135
IQR	6.64

Box Plot

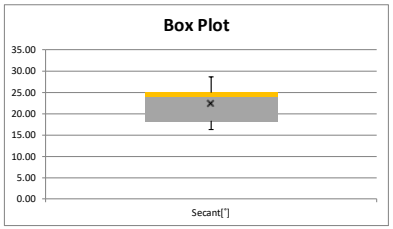
	Secant[°]
Min	16.25
Q1-Min	2.02
Med-Q1	5.70
Q3-Med	0.94
Max-Q3	3.69
Mean	22.39
Min	16.25
Q1	18.27
Median	23.97
Q3	24.91
Max	28.60
Mean	22.39
Grand Min	0
Outliers	

Shapiro-Wilk Test

	Secant[°]
W-stat	0.9170328
p-value	0.40633447
alpha	0.05
normal	yes

d'Agostino-Pearson

DA-stat	1.02131505
p-value	0.60010087
alpha	0.05
normal	yes



Test for normality 900 days

Descriptive Statistics

	Secant[°]
Mean	29.69
Standard Erro	1.21
Median	30.19
Mode	#N/A
Standard Devi	2.97049491
Sample Variar	8.82384
Kurtosis	1.84372941
Skewness	-1.2520609
Range	8.42
Maximum	32.81
Minimum	24.39
Sum	178.14
Count	6
Geometric Me	29.5579358
Harmonic Mea	29.4174147
AAD	2.15333333
MAD	1.22
IQR	2.345

Box Plot

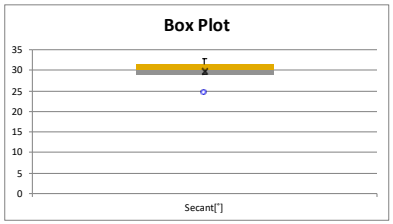
	Secant[°]
Min	29.06
Q1-Min	0.03
Med-Q1	1.11
Q3-Med	1.24
Max-Q3	1.38
Mean	29.69
Min	29.06
Q1	29.09
Median	30.19
Q3	31.43
Max	32.81
Mean	29.69
Grand Min	0
Outliers	24.39

Shapiro-Wilk Test

	Secant[°]
W-stat	0.89406398
p-value	0.34003136
alpha	0.05
normal	yes

d'Agostino-Pearson

DA-stat	3.31650069
p-value	0.19047195
alpha	0.05
normal	yes



Tubercle rate of change (slope) 120 to 900 Days

T Test: Two Independent Samples

SUMMARY — Hyp Mean D: 0

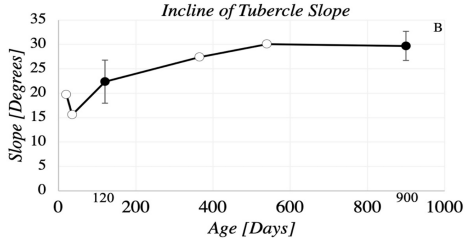
Groups	*Count*	*Mean*	*Variance*	*Cohen d*
Secant[°]	6	29.69	8.82384	
Secant[°]	8	22.39	19.4882411	
Pooled		7.30	15.0447406	1.88172492

Effect size		Effect size	
Choen's *d* score		Choen's *r* score	
0.2	Small	0.1	Small
0.5	Medium	0.3	Medium
0.8	Large	0.5	Large

T TEST: Equal Variances — Alpha 0.05

	std err	*t-stat*	*df*	*p-value*	*t-crit*	*lower*	*upper*	*sig*	*effect r*
One Tail	2.09476713	3.4842775	12	0.00225533	1.78228756			yes	0.70915701
Two Tail	2.09476713	3.4842775	12	0.00451066	2.17881283	2.73464449	11.8628555	yes	0.70915701

T TEST: Unequal Variances — Alpha 0.05

	std err	*t-stat*	*df*	*p-value*	*t-crit*	*lower*	*upper*	*sig*	*effect r*
One Tail	1.97652982	3.69270927	11.9206494	0.00155483	1.78327658			yes	0.73045303
Two Tail	1.97652982	3.69270927	11.9206494	0.00310966	2.18042248	2.98907995	11.6084201	yes	0.73045303

The average slope of the tubercle increased from 120-days-old (22.39 ± 4.41°) to 900-days-old (29.69 ± 2.79°).
This difference (7.30°), 95% CI [2.99, 11.61] was statistically significant $t(11.92) = 3.69$, $P = .003$, with a large effect size ($d = 1.88$).