

# The potential regeneration of transected hair follicles in the donor area using FUE

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# DISCLOSURES:

*The Speaker has no relevant financial relationship  
or conflict of interest to declare.*

# Background

- *What happens to transected hair follicles in the donor area?*
- *Devroye found that only 60% of transected hair follicles regrow*
- *regrowth is unpredictable but is more probable if transection occurs at the upper part of the follicle*



# Objectives

*The purpose of this study is*

*-to precisely quantify the regrowth rate of transected hair follicles by using advanced image processing techniques.*

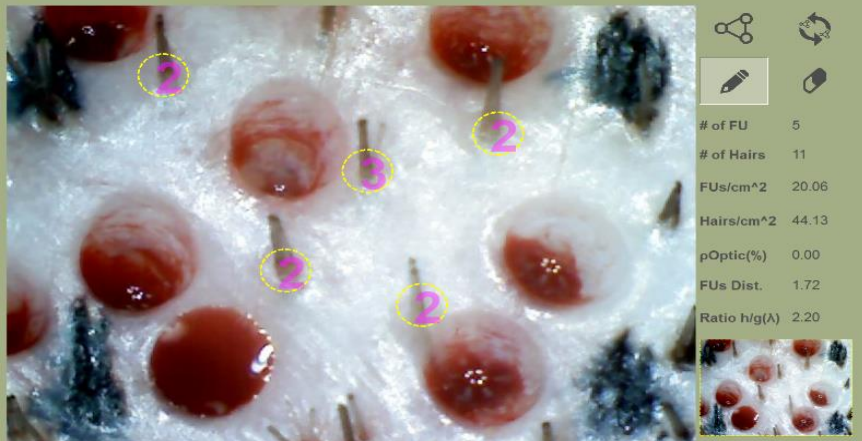
*-to investigate under which conditions a potential regeneration of hair follicles will likely occur*

# Materials and Methods

- 3 patients
- 6 areas of interest in the donor region were permanently marked by a tattoo
- A 0.6 sharp circular punch was used to deliberately increase the transection rate while harvesting within the marked areas



# Materials and Methods



*All the FUs were precisely mapped before and after the harvesting process while the extracted grafts were photographed and observed under a stereoscope*



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# Materials and Methods

*A proprietary image processing system was adapted to compare the micro-photographs taken of each study square*

*Micro photographs were taken of each study square before and immediately after the harvesting process and 9 months later.*

# Comparison of micro-photographs before and immediately after the harvesting process

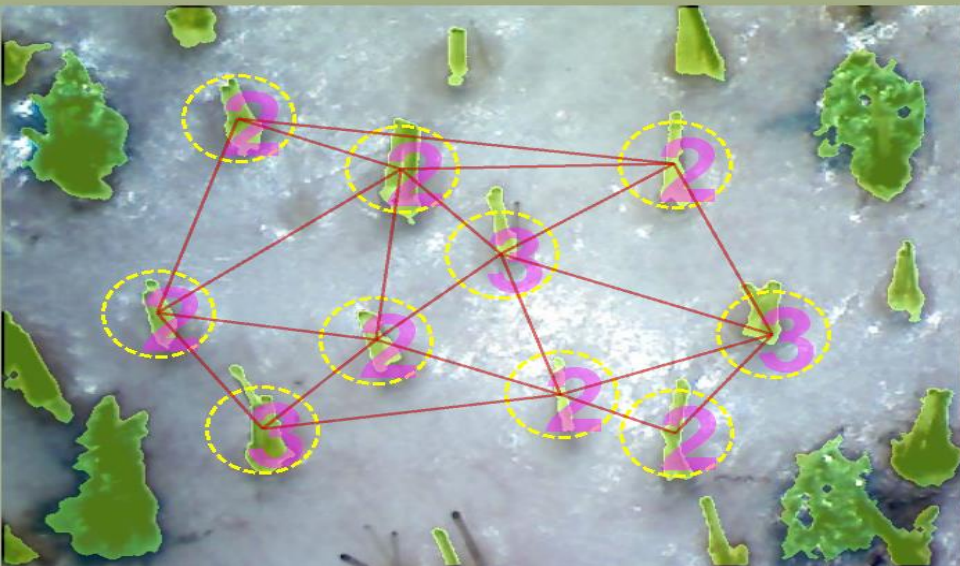


Image No1170 from Transplant Case No147 on Area Donor

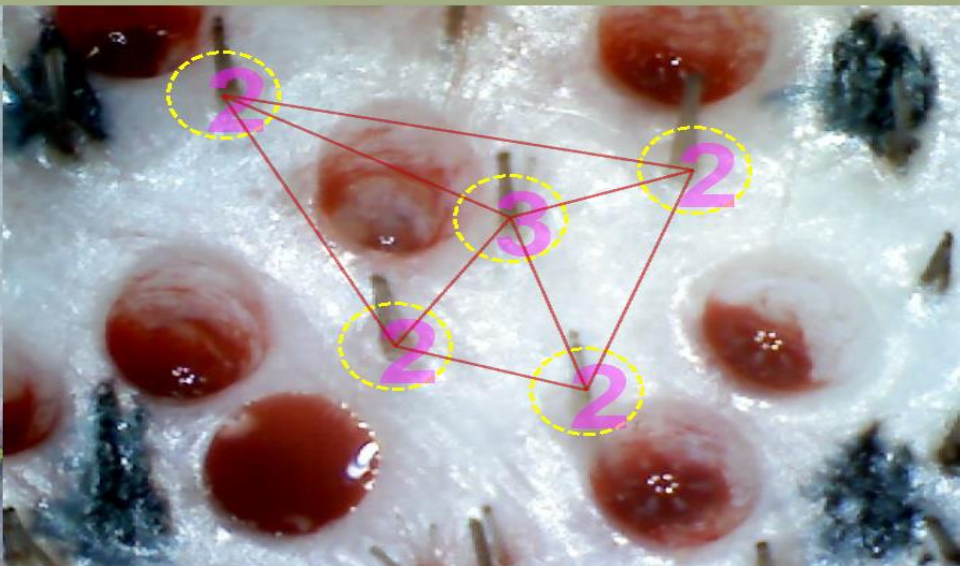


Image No1177 from Transplant Case No147 on Area Donor

Feature	Value	Value Difference	Relative Difference(%)	Value	Feature
Number of FUs	10	-5.00	-50.00	5	Number FUs
Number of Hairs	23	-12.00	-52.17	11	Number of Hairs
FUs per cm <sup>2</sup>	40.12	-20.06	-50.00	20.06	FUs per cm <sup>2</sup>
FUs Mean Distance	1.34	0.38	28.27	1.72	FUs Mean Distance
Hair to FUs ratio	2.30	-0.10	-4.35	2.20	Hair to FUs ratio
Optical Density(%)	14.19	-14.19	-100.00	0.00	Optical Density(%)
Hairs per cm <sup>2</sup>	92.27	-48.14	-52.17	44.13	Hairs per cm <sup>2</sup>



# Comparison of micro-photographs before and 9 months after the harvesting process

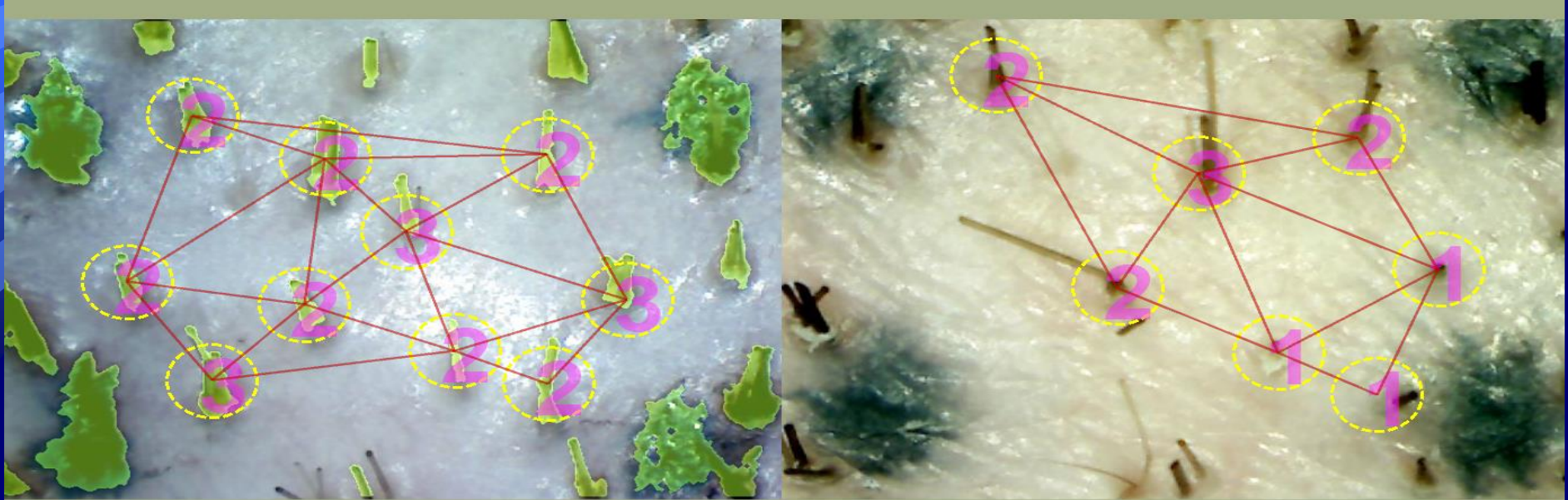


Image No1170 from Transplant Case No147 on Area Donor



Image No1448 from Follow Case No62 on Area Donor Trito

Feature	Value	Value Difference	Relative Difference(%)	Value	Feature
Number of FUs	10	-3.00	-30.00	7	Number FUs
Number of Hairs	23	-11.00	-47.83	12	Number of Hairs
FUs per cm^2	40.12	-12.03	-30.00	28.08	FUs per cm^2
FUs Mean Distance	1.34	0.22	16.15	1.56	FUs Mean Distance
Hair to FUs ratio	2.30	-0.59	-25.47	1.71	Hair to FUs ratio
Optical Density(%)	14.19	-14.19	-100.00	0.00	Optical Density(%)
Hairs per cm^2	92.27	-44.13	-47.83	48.14	Hairs per cm^2

# What was recorded ?

- *The initial number of FUs /hairs*
- *Number of harvested grafts/hairs*
- *Number of remaining FUs /hairs*
- *Number of intact extracted hair follicles*
- *Number of transected hair follicles*
- *Number of regenerated hair follicles over the study period*

# What was measured ?

- *The percentage of regeneration of transected hair follicles in each study square.*
- *Any evidence of regeneration of hair growth associated with intact extracted hair follicles .*

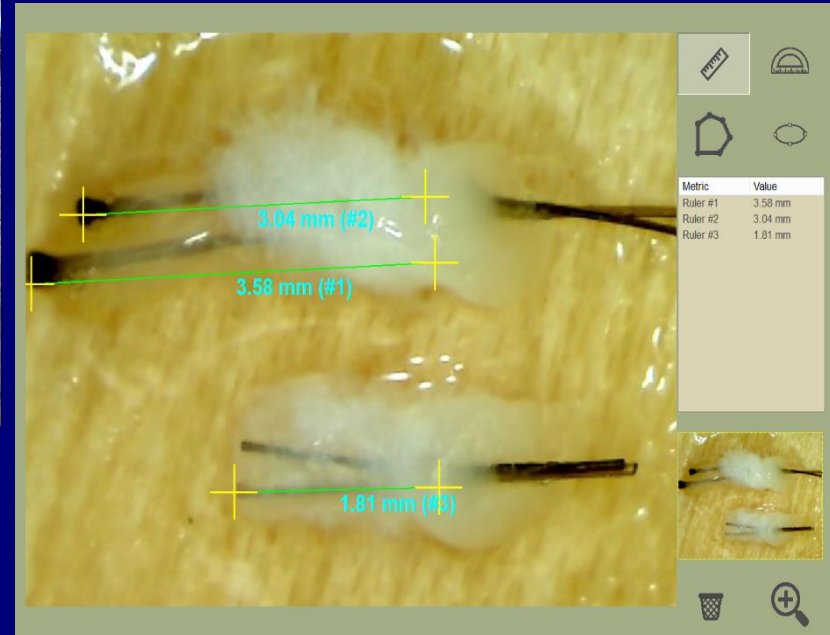
# Protocol A -Statistical analysis of the results

Grids	Transected hair follicles A	Regenerated hair follicles A	Regeneration Percentage A
1	12	10	83.33%
2	2	2	100.00%
3	6	6	100.00%
4	7	6	85.71%
5	12	12	100.00%
6	14	9	64.29%
<b>AVERAGE</b>			
<b>SUM</b>	53	45	84.91%

## Protocol B: The correlation between the location of transection and regeneration of the remaining part of the follicles



*From 3 new patients, 60 FUs were transected transversally, leaving less than 50% of the FU length.*

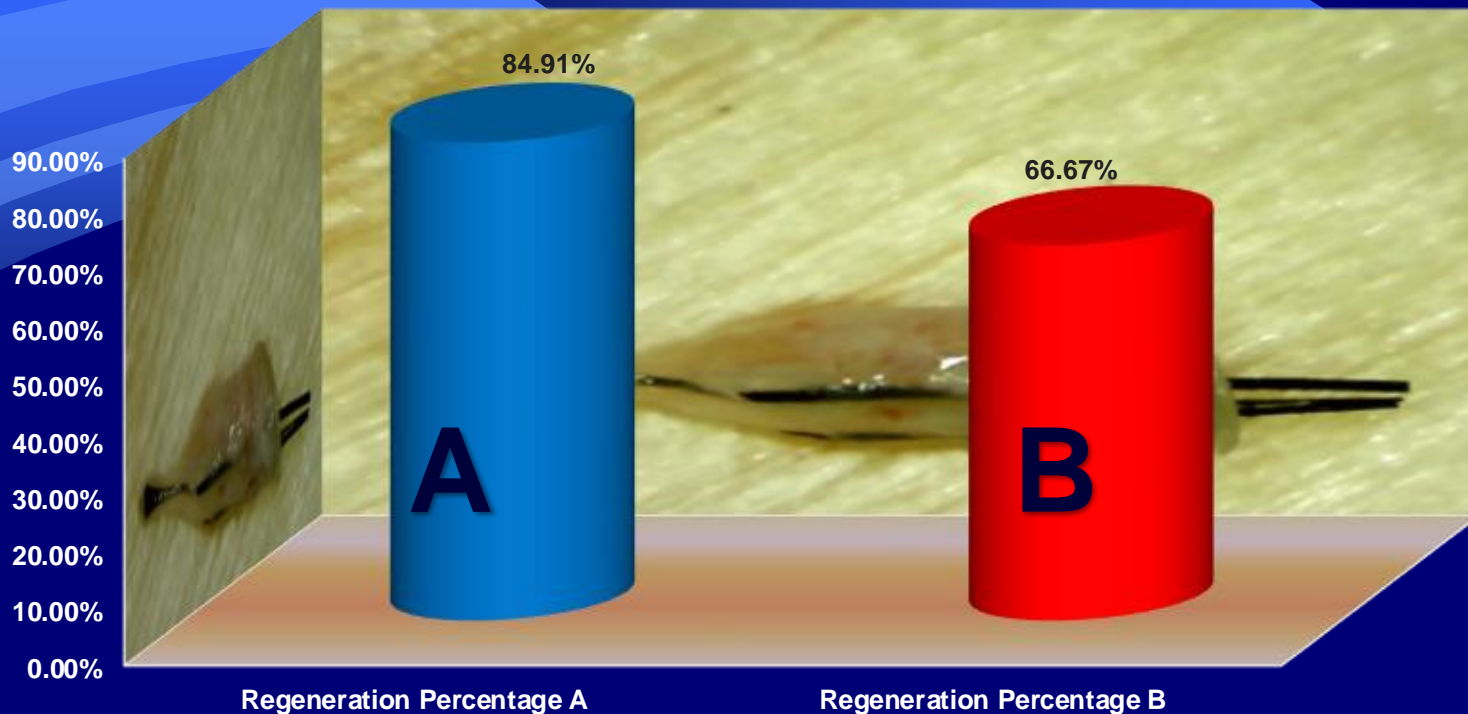


## Protocol B -Statistical Analysis of the results

Grids	Transected hair follicles B	Regenerated hair follicles B	Regeneration Percentage B
1	25	20	80.00%
2	20	11	55.00%
3	15	9	60.00%
AVERAGE			
SUM	60	40	66.67%



## Comparison of Regeneration Percentage in both Protocols

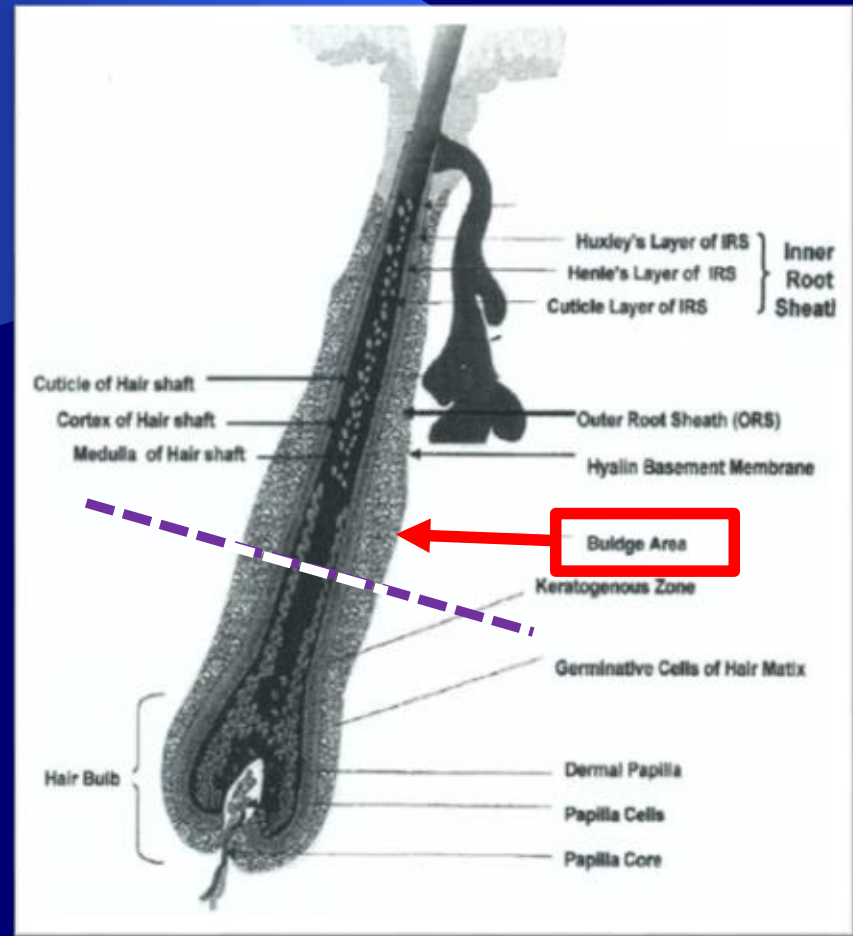


*The Regeneration Percentage in Protocol B decreased by 21.5%*

*The lower the transection level occurs, the lower the regrowth rate is*

# Conclusions

- *There is a high degree of accordance with Devroye in Protocol B.*
- *Transecting FUs ,is likely to influence their vitality.*
- *if transection occurs at the upper third part of the hair follicle the regeneration rate is 100%*
- *Any damage at the level of the hair bulge ,or absence of it, may diminish the regeneration capability of the remaining transected hair follicle*
- *A high transection rate potentially affects the harvesting capacity of the donor area especially for a novice surgeon*
- *There is no evidence of regrowth of intact extracted hair follicles.*



# The take - home message

- *The potential regeneration of transected hair follicles varies depending on where the location of transection has occurred during the FUE process.*

***Thank you for your attention!***