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## Introduction

- In facial palsy, selecting which nerve to use to re-innervate the free gracilis transfer remains controversial.
- The cross facial nerve graft provides an ideal source of motor axons from the healthy contralateral side but can lead to unfavourable results.
- The nerve to masseter provides a strong source of axons but the smile does not activate spontaneously in the majority of cases.
- An option is to utilize both nerve inputs in a supercharged or dually innervated fashion.
- The purpose of this study was to determine the effectiveness of dual innervation.

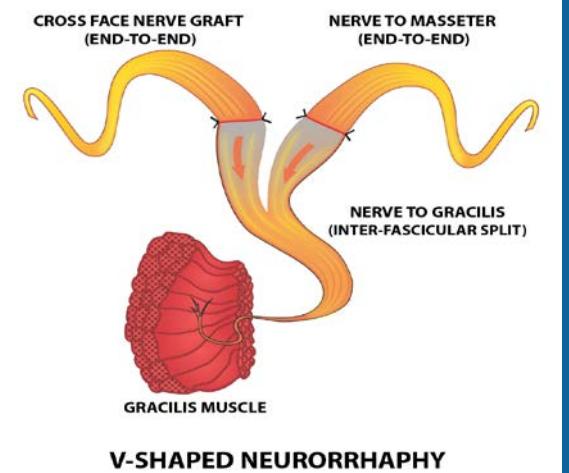
## Methods

- Measures: eFACE, FaCE Scale, spontaneous smile assay, computer vision tool used to detect expression of emotion (Affectiva, Boston, USA).

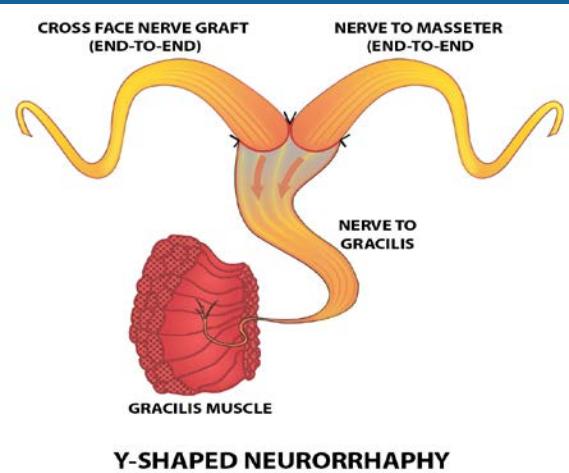
## Results

- 37 dual innervated flaps (29 in 2016/7). Mean F/U 24 months
- Significant eFACE and FaCE scale improvements.
- Joy expression from voluntary smile effort in dual innervated flaps increased 78.1% (Contempt expression reduced 61.7%) Table 1.
- Synchronous movement of the face improved following dual innervation.
- No significant difference was detected in spontaneous joy expression with any technique. (Data not shown)
- 3 neurorrhaphy techniques used: V-shaped (interfascicular split), Y-shaped and End-to-Side. Figures 1-3.

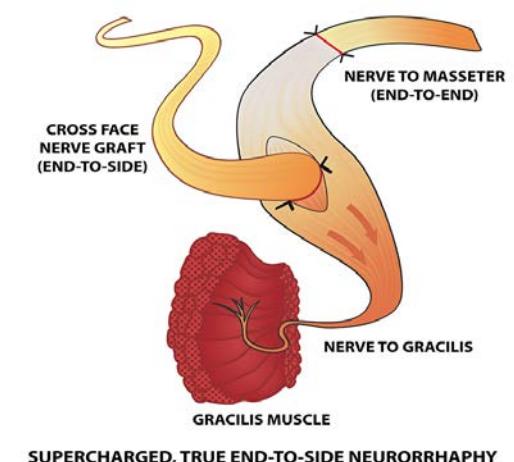
## Figure 1: V-shaped (43%)



## Figure 2: Y-shaped (22%)



## Figure 3: End-to-Side (35%)



## Table 1: Emotionality of Volitional Smile

	Pre-operative*	Post-operative*	Delta	P-value**
<b>Joy Expression</b>				<b>0.004</b>
Dual	0.0 (0; 2)	78.2 (67; 84)	78.1	
Masseteric	0.0 (0; 27)	88.3 (6; 96)	88.3	
Cross Face	0.0 (0; 84)	83.6 (41; 95)	83.6	
<b>Contempt Expression</b>				<b>0.001</b>
Dual	70.5 (57; 86)	0.9 (0; 9)	61.7	
Masseteric	64.1 (18; 99)	0.0 (0; 2)	78.6	
Cross Face	77 (43; 99)	1.1 (0; 21)	74.0	

\*median % (interquartile range)

\*\*Wilcoxon Signed Ranks test

## Conclusions

- Gracilis flaps improve emotionality of volitional smile significantly by both increasing joy expression and reducing contempt expression.
- In spontaneous smile, duals increased synchronous facial movements but not expression of joy when compared to nerve to masseter alone.
- Dual innervation of a muscle from two motor sources is possible. It remains to be seen whether this technique significantly improves the functional outcome of smile reanimation, which is to express emotion, both voluntarily and spontaneously.