become popular procedures to improve facial symmetry and dynamic facial reanimation. In this study we seek to look at oral commissure excursion as an objective measure of function and symmetry between these two dynamic facial reanimation procedures.

METHODS: A retrospective chart review was performed of patients with facial palsy who received either CFNG-FGMT or LTM from 2008–2016 at a single institution. Analysis of the normal and affected sides of the face, in repose and while smiling, in pre- and post-operative photographs was performed by using the Facial Assessment by Computer Evaluation (FACE-gram) software. Commisure displacement was measured in three vectors. Statistical analysis included Wilcoxon rank sum, Fisher exact test, and multi-level mixed-effects regression.

RESULTS: Five patients with LTM and 11 with CFNG-FGMT met inclusion criteria. Overall outcomes for these 16 patients based on univariate analysis showed that there was an improvement in symmetry based on oral commissure excursion while smiling preoperative 14.85 ± 5.19, postoperative 4.39 ± 7.75mm (p=0.0001). Mixed regression analysis controlling for time showed that surgery causes a 7.56 ± 2.49mm improvement from preoperative to postoperative (p = 0.002). Using a mixed regression that controlled for time, CFNG-FGMT showed an overall 10.03 ± 5.10mm asymmetrical difference in commissure excursion when compared to LTM in postoperative smile of paralyzed relative to normal side. For LTM, there was a significant postoperative improvement of excursion at rest and while smiling (22.53 ± 8.31mm and 17.54 ± 8.90mm, p= 0.01 and 0.05, respectively.) Of note, for LTM statistically significant improvement in smile started within 3 months postoperatively (18.09 ± 4.82 mm, p<0.01) While univariate analysis for CFNG-FGMT showed improved symmetry between the paralyzed to normal side between preop 14.25 ± 5.27mm to postop 5.33 ± 6.88mm (p<0.01), after controlling for time, the significant difference was removed. A statistically significant improvement in facial symmetry was not seen until the 3–6 months postoperatively 7.28 ± 2.32 mm, (p<0.01).

CONCLUSION: Our results show that overall commissure excursion improves postoperatively for both LTM and CFNG-FGMT. However, LTM had a greater improvement in excursion and symmetry at rest and during smile. Results are significant within the first 3 months post operatively. While CFNG-FGMT shows overall improvement in postoperative commissure excursion during smile, significant improvement takes greater time, with less overall excursion and symmetry than LTM.

Reference Citations:
1. Bray D, Henstrom DK, CheneyML, Hadlock TA. Assessing outcomes in facial reanimation: evaluation and validation of the SMILE system for measuring lip excursion during smiling. Arch Facial Plast Surg. 2010;12(5):352–354.

The Influence of Age and Etiology on Operative Outcomes in Facial Palsy after Cross Face Nerve Graft with Free Gracilis Muscle Transfer

Presenter: Kristin Faschan, MD
Co-Authors: Daniel Mazzaferro, MBA; Tami Konieczny, MS, OTR/L; Oksana Jackson, MD; Scott P. Bartlett, MD; Phuong Nguyen, MD
Affiliation: The Children’s Hospital of Philadelphia, Philadelphia, PA

INTRODUCTION: Facial palsy etiologies are classified as congenital or acquired. Treatment strategies are based on the subject’s age, severity of disease, and surgeon experience. It is unclear whether etiology affects outcome. Herein, we seek to compare outcomes after two-stage free gracilis muscle transfer (CFNG-FGMT) for long-standing facial palsy between patients with congenital versus acquired disease.

METHODS: A retrospective chart review was performed of all patients with facial palsy who received unilateral two-stage facial reanimation surgery from 2008–2016 at a single institution. Surface EMG and Sunnybrook scores were recorded. Statistical analysis utilized Wilcoxon rank sum and fisher exact test for demographics and etiology. A univariate and multi-level mixed-effects regression analysis was performed to compare congenital vs. acquired patients who underwent CFNG-FGMT. Analysis of the normal and affected sides of the face, in repose and while smiling, pre- and post-operatively was performed by using the Facial Assessment by Computer Evaluation (FACE-gram) software.1 Commissure displacement was measured in three vectors.
RESULTS: Fourteen patients met inclusion criteria. Six patients had congenital facial palsy and 8 patients had acquired. The average age at time of surgery was 10.3±4.4 years for congenital and 14.0±5.7 years for acquired etiology (p=0.20). Causes of congenital disease included idiopathic (5) and birth trauma (1). Causes for acquired facial palsy were tumor resection (5), meningitis (1), and trauma (2). On univariate analysis, surface EMG scores averaged 55.36 for congenital patients and 33.63 for acquired patients (p=0.01). Using a mixed regression model that controlled for sex, age and time after surgery, there was no significant difference between congenital and acquired subjects in surface EMG measurements, open smile Sunnybrook scores, or total Sunnybrook scores (p=0.23, 0.88, and 0.52; respectively). However, a mixed regression model was used to analyze data from FACE-gram. Patients with acquired facial palsy, relative to congenital, had an average difference of 7.08 +/- 2.99 mm in overall commissure displacement when comparing paralyzed to unaffected side over time. (p=0.018).

CONCLUSION: When comparing congenital versus acquired etiologies, our results demonstrate that there is no significant difference in post-operative Sunnybrook scores or muscle activity for patients who have undergone two-stage CFNG-FGMT; however, it appears that by objective measurement using FACE-gram there is a greater degree of persistent asymmetry in patients with acquired facial palsy after dynamic two-stage reconstruction.

Reference Citations:
1. Bray D, Henstrom DK, CheneyML, Hadlock TA. Assessing outcomes in facial reanimation: evaluation and validation of the SMILE system for measuring lip excursion during smiling. Arch Facial Plast Surg. 2010;12(5):352-354.

Comparison of Muscle Activity and Facial Symmetry in Lengthening Temporalis Myoplasty Vs. Two-Stage Free Gracilis Muscle Transfer in Children

Presenter: Daniel M Mazzaferro, MBA
Co-Authors: Kristin Faschan, MD; Ari M. Wes, BA; Oksana Jackson, MD; Scott P. Bartlett, MD; Phuong Nguyen, MD

INTRODUCTION: Two facial reanimation procedures currently being used – lengthening temporalis myoplasty (LTM) and cross face nerve graft with gracilis free flap transfer (CFNG-FGMT) – have become popular methods to improve facial symmetry and dynamic facial reanimation. In this study we seek to compare onset of muscle activity and facial symmetry after these dynamic reanimation procedures.

METHODS: A retrospective review of patients at a children’s hospital who underwent LTM or CFNG-FGMT for facial palsy was performed. sEMG measurements were recorded at maximum open smile along with complete Sunnybrook scores at postoperative evaluations. Statistical analysis included Wilcoxon rank sum, Fisher exact test, and multi-level mixed-effects regression.

RESULTS: Five patients with LTM and 14 with CFNG-FGMT were identified. The average age at time of surgery was 14.3±5.7 years for LTM and 12.4±5.4 years for CFNG-FGMT (p=0.41). There was no difference in number of treatment sessions between LTM and CFNG-FGMT patients (9.0 ± 4.9 vs. 10.3 ± 11.8, p=0.661). Significant muscle activity was first identified in LTM patients after 3 months (44.4 ± 12.2mV, p<0.001) and CFNG-FGMT patients after 2 months (38.3 ± 17.4mV, p=0.028). Beta-coefficient regression revealed a steeper slope of increase in sEMG in LTM compared to CFNG-FGMT patients (9.2mV/month versus 2.3mV/month, respectively). CFNG-FGMT patients exhibited a 17.0 ± 5.9 Sunnybrook score increase at the 6–9 month interval relative to the first three months after surgery (p=0.004). Sunnybrook scores were not different between LTM and CFNG-FGMT patients when assessed for interval increase (p=0.905)

CONCLUSION: Facial reanimation outcomes can be reliably assessed with sEMG and Sunnybrook scores. LTM demonstrates a faster rate of muscle recruitment compared to CFNG. Both LTM and CFNG-FGMT demonstrate muscle activity at 2–3 months. Facial symmetry by Sunnybrook score improves at 6–9 months postoperatively.