Time to Intervention as a Predictor of Improvement in Facial Nerve Function

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Introduction

- Facial nerve impairment results in physical and psychosocial sequelae
- Physical limitations after facial nerve injury include oral incompetence, visual impairments, and difficulty with articulation
- Facial nerve paralysis, palsy, and synkinesis inhibit normal facial expressions and can lead to social isolation, depression, and a decreased quality of life [1]
- Treatment for facial nerve disturbances aim to restore facial symmetry and function, and include surgical and nonsurgical options
- Patients are unfamiliar with facial nerve specialists at the time of diagnosis, leading to delayed consultation and intervention

Hypothesis:

- Shorter time to intervention will lead to improved outcomes of post-intervention facial nerve function in terms of composite Sunnybrook Facial Grading System (SFGS) scores

Figure 1: Before and After Facial Nerve Rehabilitation

Methods

Study Design and Patient Selection

- Retrospective review
- Patients diagnosed with facial nerve dysfunction between December 2016 and March 2020
- Patients underwent surgical and non-surgical interventions:
  - Surgical: Selective neurolysis (SN), neurorrhaphy, gracilis muscle transfer
  - Non-surgical: Botox and facial nerve rehabilitation
    - Rehabilitation with a Facial Nerve Rehabilitation Specialist

Outcome Measure

- Facial nerve dysfunction was quantified by pre- and post-intervention SFGS scores determined by the institution's Facial Nerve Rehabilitation Specialist
- SFGS evaluates resting symmetry, voluntary movement, and synkinesis, and includes a composite score ranging from 0 (complete paralysis) to 100 (normal) [2]

Predictors

- Time from onset of facial nerve disturbance to any intervention: irst notice of facial nerve paralysis, synkinesis, or paresis by the patient or a healthcare professional
- Etiology of disturbance (determined at time of presentation): possibilities included iatrogenic, post-trauma, post-stroke, Bell's Palsy, Ramsay Hunt Syndrome
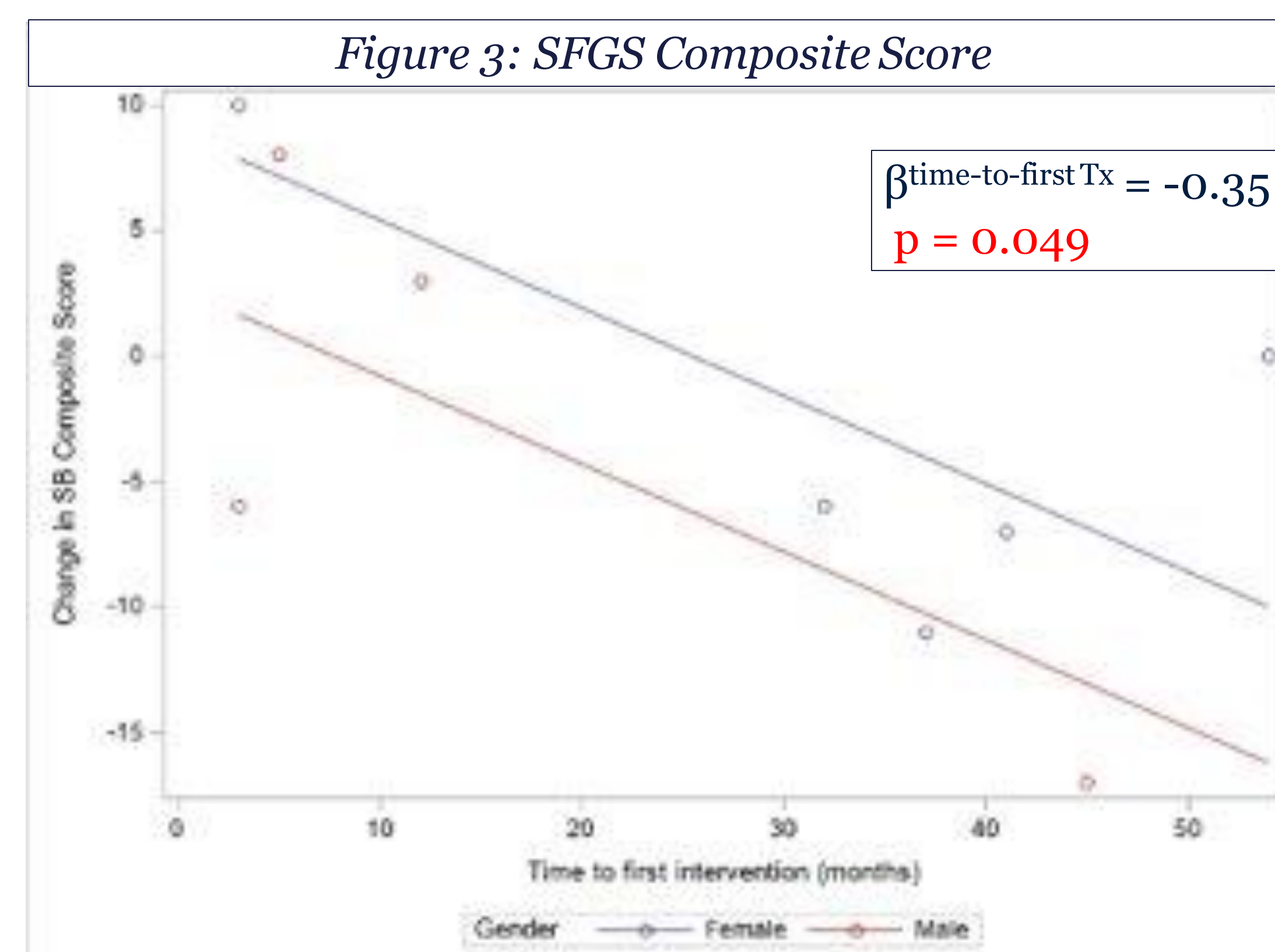
Results

- Of 145 patients with facial nerve impairment:
  - 33.1% had synkinesis
  - 66.9% had paralysis or paresis without synkinesis
- Nine patients had both pre- and post-intervention Sunnybrook scores for comparison
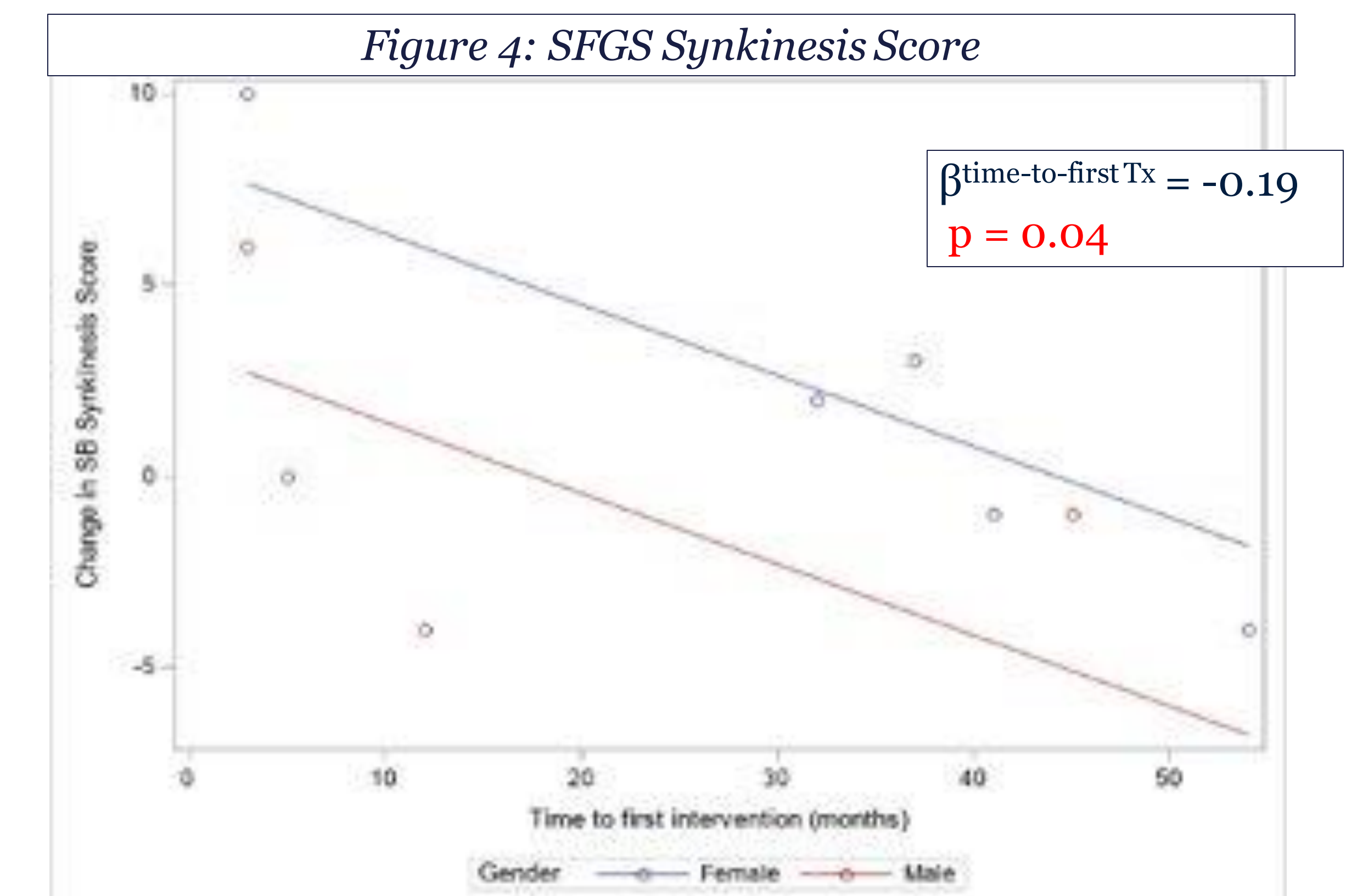
Table 1: Correlations between Time to Intervention, SFGS Composite Score and Age at First Intervention

	Time to First Intervention	SFGS Composite Score
Time to First Intervention (months)	1.00	-0.63 p=0.07
Age at First Intervention	0.76 p=0.02	-0.73 p=0.03

Figures 3-4 demonstrate significant correlation between SFGS scores and time to intervention:

Figure 3: SFGS Composite Score

$\beta^{\text{time-to-first Tx}} = -0.35$
p = 0.049

Longer time to first intervention was associated with smaller change in composite scores. This was significant.

Figure 4: SFGS Synkinesis Score

$\beta^{\text{time-to-first Tx}} = -0.19$
p = 0.04

Longer time to first intervention was associated with smaller change in synkinesis scores. This was significant.

Discussion

Associated with improvement of SFGS scores:

- Shorter time from onset of facial nerve dysfunction to surgical or non-surgical intervention
  - composite and synkinesis SFGS scores
- Younger age at first intervention

Limitations:

- Single institution study
- Small sample size
- Retrospective nature
- Lack of standardized scoring timepoints

Future Directions:

- Increasing the sample size
- Including a broader scope of surgical interventions analyzed
  - A 'surgical intervention only' cohort

Conclusion

- Shorter time from onset of facial nerve dysfunction to surgical or non-surgical intervention and younger age at the time of first intervention was associated with a greater improvement in composite and synkinesis SFGS scores
- We encourage patients to seek consultation with a facial nerve specialist early in their disease course to avoid delay in surgical or nonsurgical interventions

References

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2. Ross BG, Fradet G, Nedzelski JM. Development of a sensitive clinical facial grading system. Otolaryngol Head Neck Surg. 1996;114(3):380-386. doi:10.1016/s0194-5998(96)70206-1

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