**Supplementary Digital Content**

**Supplementary Digital Content 3.** **Chuang’s Cortical Adaptation Staging System**

|  |  |
| --- | --- |
| **Stages** | **Muscle Function** |
| Stage I | No movement |
| Stage II | Dependent movement |
| Stage III | Independent movement |
| Stage IV | Spontaneous movement, with presence of involuntary movement |
| Stage V | Spontaneous movement, with little or no involuntary movement |

**Tables**

Table 1: Movement Disorders in PPFS

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Synkinetic Movement  Trigger  Movement | Frontal /corrugator  contraction  --> tension face | Orbicularis oculi contraction  --> narrow eye | Levators of upper lip contraction  --> mouth angle  twitching | Depressors of lower lip  contraction  --> lower lip retracted | Depressors of lower lip  contraction  --> chin dimples | Platysma contraction  -->neck bands |
| Forehead raise | (0) to (+++)\* | (0) to (+++) | (0) to (+++) | (0) to (+++) | (0) to (+++) | (0) to (+++) |
| Eye closure | (0) to (+++) | (0) to (+++) | (0) to (+++) | (0) to (+++) | (0) to (+++) | (0) to (+++) |
| Smile | (0) to (+++) | (0) to (+++) | (0) to (+++) | (0) to (+++) | (0) to (+++) | (0) to (+++) |
| Lower lip pulled down | (0) to (+++) | (0) to (+++) | (0) to (+++) | (0) to (+++) | (0) to (+++) | (0) to (+++) |
| Lip pouting (whistling) | (0) to (+++) | (0) to (+++) | (0) to (+++) | (0) to (+++) | (0) to (+++) | (0) to (+++) |

Severity of synkinesis (4 degrees): none (0) , mild (1+), moderate (2+) and severe (3+)

Table 2: PPFS Patient Demographics

|  |  |  |  |
| --- | --- | --- | --- |
| Total No. patients | 100 | | Pts |
| Mean age (range), years | 32.2 (6-73) | < 15 Y/O,  15-49  >50 | 6  77  17 |
| Gender (Male/Female) | 36: 64 | | |
| Affected side (right : left) | 53:47 | | |
| Etiology | | | |
| Bell's palsy | | | 35 |
| Trauma | | | 22 |
| Infection | | | 19 |
| After tumor resection | | | 18 |
| Facial nerve injury and repair | | | 4 |
| Other (brain infarction) | | | 1 |

Table 3. Deformities following FFMT

|  |  |  |  |
| --- | --- | --- | --- |
| Location | Deformity | Surgical Correction | Incidence (pts) |
| Upper lip | Contracture of mouth angle or upper lip with abnormal deep fold formation | 1. release of contracture and dermafat graft  2. TFL cheek skin suspension  3. V-Y plasty or Z-plasty  4. botox  5. selective neurectomy of the affected facial nerve  6. lip adhesion (2 stages) | 14 |
| 9 |
| 10 |
| 4 |
| 2 |
| 5 |
| Wide vermilion | Thinning procedure | 5 |
| Cheek | Bulkiness | 1. debulking  2. gracilis upward advancement | 5 |
| 2 |
| Uneven surface | Rigotomy and fat grafts | 18 |
| Deep nasolabial fold/Marrionette line | 1. rigotomy and fat graft  2. TFL cheek skin suspension  3. V-Y plasty or Z-plasty | Overlapped |
| Abnormal facial wrinkles | Rigotomy and fat grafts | Overlapped |
| Eyelid | Corrugator muscle hypertrophy | Corrugator resection | 9 |
| Ptosis | Browlift | 2 |
| Lagophthalmos | 1. lateral tarsorrhaphy  2. temporalis muscle transfer  3. FFMT | 5 |
| 1 |
| 5 |
| Asymmetry | Double eyelid formation | 8 |
| Lower lip | Asymmetry | 1. wedge resection of the lower lip  2. myectomy of the healthy side depressors | 2 |
| 6 |
| Drooling/dimpling | 1. wedge resection  2. plantaris tendon suspension  3. dermofat graft | 2 |
| 1 |
| 1 |
| Tight band | Release of aponeurosis or plantaris tendon | 2 |
| Others | Hypertrophic scars | Scar revision | 1 |

FFMT, functioning free muscle transplantation

Table 4. Advantages and disadvantages between Selective Neurectomy and Aggressive Surgical Procedures

|  |  |  |
| --- | --- | --- |
|  | Selective Neurectomy | Aggressive Surgical Procedures |
| Representative | Azizzadeh B | Chuang DCC |
| Advantages | 1. Simple operation (neurectomy) 2. Quick surgery (2-3 hrs) 3. Less scars 4. Less facial disfigures postoperatively | 1. Technique: complex but straight forward 2. Usually no need of BTX-A 3. Usually no need for simultaneous rhytidectomy 4. 2nd deformity can be easily corrected by revision surgery (usually performed at one year postoperatively) 5. Results: predictable and long-lasting |
| Disadvantages | 1.Technique: difficult in decision making, and unpredictable results  2.High need for adjuvant surgery such as rhytidectomy,  fat grafting  3. Continues need BTX-A treatment  4.Timing of revision surgery: uncertain (immediately or days later?) | 1.Complex operation (neurectomy + myectomy + reconstruction)  2. Long surgery (6-10 hrs)  3.Need micro-neural- vascular anastomoses  4.More operative scars  5.High rates of revision surgery |