Facial nerve rehabilitation

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Facial nerve functions

Motor:
- muscles of facial expression
- postérieur belly of the digastric
- stylohyoid
- stapedius muscle

Sensory:
- Ramsay Hunt area
- anterior two thirds of the tongue

Parasympathetic
- Lacrimal glands (Petrus nerves)
- submandibular gland
- sublingual gland
Clinic evaluation of the VII

- Peripheral vs Central
  - Motor deficit homogeneity
  - Charles Bell sign and Souques sign
  - No automatic voluntary dissociation
Clinic evaluation of the VII

At rest

Motion
### House Brackman scale:
- The most common but unhelpful for the surgical outcomes

#### Clinic evaluation of the VII

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
<th>Characteristics</th>
<th>Estimated Function (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>normal</td>
<td>normal, normal symmetry &amp; tone</td>
<td>100</td>
</tr>
<tr>
<td>II</td>
<td>mild dysfunction</td>
<td>slight weakness noticeable on close inspection, may have very slight synkinesis, normal symmetry &amp; tone</td>
<td>80</td>
</tr>
<tr>
<td>III</td>
<td>moderate dysfunction</td>
<td>obvious but not disfiguring difference between 2 sides; noticeable but not severe synkinesis, contracture, and/or hemifacial spasm, normal symmetry &amp; tone</td>
<td>60</td>
</tr>
<tr>
<td>IV</td>
<td>moderately severe dysfunction</td>
<td>obvious weakness and/or disfiguring asymmetry, normal symmetry &amp; tone</td>
<td>40</td>
</tr>
<tr>
<td>V</td>
<td>severe dysfunction</td>
<td>only barely perceptible motion, asymmetry</td>
<td>20</td>
</tr>
<tr>
<td>VI</td>
<td>total paralysis</td>
<td>no movement, asymmetry</td>
<td>0</td>
</tr>
</tbody>
</table>
Clinic evaluation of the VII Grade
Sunnybrook facial grading system

- Provide longitudinal numerical data which may help quantitate post surgical evaluation.
Paraclinical tests

- Audiometric test, stapedian reflex
- Electromyography
- RMI, CT Scan
- Facial veissel Hand held Doppler to assess the suitability as recipient veissel if free tissue transfert is to be done.
- Blood test (serologies, diabet test...)
Sequelae

- Psychological, esthetic impacts.
- Ocular complication.
- Labial dysfunction.
- Synkinesis.
- Hemi facial Spasms.
- Secretory syndrome.
Facial paralysis: sequelae treatment

- Eyes:
  - Lagophthalm
  - Keratitis
  - Weeping

- Labial sphincter dysfunction

- Spasms
- Synkinesis
Sequelae treatment

- It can be surgical or non-surgical
- Facial rehabilitation: static procedure
- Facial reanimation: dynamic procedure
- Process are adapted to the face part and this impact
Objectives

- At Rest symetry.
- Motricity and symmetry in motion.
- Eye protection and eyes closure.
- Labial function.
- Improve the quality of life
Static procedure

- Indications:
  - Elderly.
  - Unwilling prolonged surgery.
  - Unviable facial musculature.
  - Massive facial defects.
  - Failed dynamic procedure.
- Spasms and synkinesis: botulinum toxin.
Static procedure

- Superior part of the face
  - Bow dropping:
    - Forehead lifting
    - Brow suspension

- Lagophthalmia:
  - Temporary or permanent tarsorrhaphy
  - Gold weights (1-1.6 g)
  - Mullerectomy
Static procedure

- Middle part of the face
  - Cheek tissues ptosis:
    - Centro-facial lifting

- Inferior part of the face
  - Oral comissure droop
    - Elevate corner of the mouth (TFL 5-25 cm)
  - Labial hypotrophy:
    - lipofilling, hyaluronic acid
  - Depressor anguli oris:
    - controlateral botulinum toxin

Fascia lata was tied to the orbicularis oris muscle in the left corner of the mouth and symmetry of the lips and laugh line was corrected.
Static procedure

- Botulinum toxin:
  - Homolateral: Spasms and synkinesis
  - Controlateral if hyperactivity
  - Controlateral to symmetrise a smile
Dynamic procedure

- Nerves repair
  - Nerve graft
  - VII XII anastomosis
  - cross facial anastomosis

- Muscular transfers:
  - Temporalis myoplasty
  - Masseter or ant belly of the digastric flap
  - Free flap transfer
Dynamic procedure

- General Rules:
  - Early (<1 year): nerve based reconstruction
  - Use the contralateral facial nerve if it’s possible
  - Late (>1 year): muscle based reconstruction
    - Free muscle transfers: versatility, precision
Dynamic procedure: nerve repair

Rules

- Less is more approach
- No tension (8/0 gauge suture to have an under too much tension)
  - Minimally debride the nerve ends
  - Free the nerves from the surrounding tissues
- Accuracy of coaptation and sutures (microscope)
  - Use the least number of suture
Dynamic procedure: nerve repair

- Nerve graft:
  - Greater auricular nerve
    - Easy to harvest
    - Same surgery time
  - Sural nerve
    - Easy to harvest
    - Two teams approach
    - Minimal morbidity

Figures 13, 14: Greater auricular nerve runs parallel to external jugular vein. Note transverse cervical nerves coursing anteriorly from Erb's point.

Figures 15a, b: Sural nerve harvesting techniques.
Dynamic procedure: nerve repair

- Cross facial nerve grafting:

- Hypoglossal nerve transfer:

- Nerve to masseter reanimation technique:
Local muscle flap or free flap transfer

- After long standing atrophy
- Also used as a adjunct to the mimetic muscle.

Local flap:
- Masseter flap
  - Detached from the lower mandibular border
Local flap :

Temporalis lengthening myoplasty:
- Good option for smile reinnervation
- It may also used with a VII XII anastomosis.
- Neurological and vascular assess before the surgery
- Physical therapy is necessary but good results because of the cortical plasticity
Dynamic procedure: muscular transfer

- Free flap:
  - Gracilis:
    - Minimal donor morbidity
    - No functional deficit
    - Reliable anatomy
    - Nerve and vascular pedicle easy to harvest.

Figure 39: Gracilis muscle with nerve and vascular pedicle
Figure 41: Segmental muscle dissection to reduce bulk
Figure 42: Insert into orbicularis oris
Conclusion

- There a lot of to do to improve the sequelae of facial palsy
- The procedures depends of the experience of the surgeon and the length of palsy.
- The sequelae treatments must be consider area by area.