CURRENT DIAGNOSTIC, PHARMACEUTIC AND RECONSTRUCTIVE SURGICAL METHODS IN THE MANAGEMENT OF FACIAL NERVE PALSY

Ph.D. Thesis

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IV. Fekete-Szabó G, Berényi I, **Kecskés G**, Madani S, Pozsár I, Bereczki Cs. Otogen abducens paresis gyermekkorban. *Fül-, Orr-, Gégegyógy.* 2007;53(3):125-129.

V. Fekete Szabó G, Berényi I, **Kecskés G.** Adenotómia elvégzése szemellenőrzés mellett. *Fül-, Orr-, Gégegyógy*.2007;53(1):30-33.

TABLE OF CONTENTS

1 INTRODUCTION

1.1 The facial nerve

The facial nerve consists of a motor and a sensory part, the latter being frequently described as the nervus intermedius (pars intermedii of Wrisberg). The nerve contains 10 000 fibers out of which7 000 are myelinated motor fibres. Most of the motor fibers travel to the extratemporal portion of the facial nerve and innervate the muscle of the face, scalp, and auricle, the buccinator and platysma, the stapedius, the stylohyoideus, and posterior belly of the digastricus. The remaining 3 000 fibers branch off prior to the stylomastoid foramen and provide autonomic and special sensory innervations to the salivary and lacrimal glands as well asconvey tastesensations from the anterior two-thirds of the tongue. They also provide sensory fibers to the posterior aspect of the external auditory canal.

1.2 The primary function of the facial nerve

The primary function of the facial nerve is to express voluntary behaviour and spontaneous emotions via innervating twenty-three facial muscles on each side of the face.Facial expressions are ranging from phasic, short-lasting or even flash-like muscle contractions representing momentary emotions or voluntary acts, up to tonic, long-standing muscle activation representing moods or dispositions. Damage to the facial nerve affects all muscles of the facial expression thus facial paralysis is one of the most devastating peripheral nerve injuries. Patients suffer serious functional, cosmetic and psychological problems with impaired ability to communicate both verbally and non-verbally. The loss of oral competence may lead to drooling and difficulty with articulation.Loss of eye sphincter function, especially in the absence of tearing, can lead to blurred vision, exposure keratopathy and corneal ulceration. The most dramatic impact of the paralysis is however its psychological effect which may lead toisolation and fear of interaction with others.

1.3 The facial nerve palsy-aetiology and pathophysiology

Facial nerve palsy could be temporary or permanent and could manifest itselfin partial weakness to total paralysis of the mimic muscles.The grade of dysfunction depends on the aetiology, the localization and degree of the nerve injury.Trauma, herpes zoster oticus, polyneuritis, Borrelia, tumor, diabetes mellitus and surgery are known etiologic and/or concomitant factors involved in the disease.

When the relevant cause of palsy is idiopathic, the condition is known as Bell's palsynamed after Sir Charles Bell (1774-1842).In the first half of the 19thcentury, he discovered the function of the facial nerve and attracted the attention of the medical world to facial paralysis. Although he has long been considered to be the first to describe idiopathic facial paralysis, recent publications[1] concluded that Cornelis Stalpart van der Wiel was the first to record Bell's palsy in 1683. In 1804 and 1805, Evert Jan Thomassen à Thuessink (1762-1832) published what appears to be the first known extensive study on idiopathic peripheral facial paralysis[2]. He believed that idiopathic peripheral facial paralysis was caused by 'rheumatism' or exposure to cold. Despite the fact that many other etiological theories have since been proposed, this hypothesis persists even today.

1.4 Classification of the facial nerve palsy

There is no single classification system that can describe all the many variations of nerve injuries. Most systems attempt to correlate the degree of injury with symptoms, pathology and prognosis. In 1943, Seddon[3] introduced a classification of nerve injuries based on three main types of nerve fiber injury and whether there is continuity of the nerve. The three types are: axonotmesis, neuropraxia and neurotmesis (Table 1.)

Table 1. Seddon's classification of periferial nerve injuries

	Neuropraxia	**Axonotmesis**	**Neurotmesis**
Pathological			
Anatomical continuity	Preserved	Preserved	May be lost
Essential damage	Selective demyelination	Nerve fibers interrupted	Complete disorganisation
Clinical			
Motor paralysis	Complete	Complete	Complete
Muscle atrophy	Very little	Progressive	Progressive
Sensory paralysis	Usually much sparing	Complete	Complete
Autonomic paralysis	Usually much sparing	Complete	Complete
Electrical phenomena			
Reaction of degeneration	Present	Present	Present
Nerve conduction distal	Preserved	Absent	Absent
Motor-unit action potential	Absent	Absent	Absent
Fibrillation	Occasionally detectable	Present	Present
Recovery			
Surgical repair	Not necessary	Not necessary	Essential
Rate of recovery	Rapid, days or weeks	1-2 mm/day	1-2 mm/d after repair
March of recovery	No order	According to order of innervations	According to order of innervations
Quality	Perfect	Perfect	Always imperfects

In 1953 Sunderland [4]created a more detailed classification system describing the severity of the nerve injury, summarized here:

- 1st degree(Seddon's neuropraxia): electrical conduction is blocked but axoplasmic flow continues bidirectionally. Usually it is result of compressive leasion or mild trauma. This is the least severe form of nerve injury, usually with complete recovery.
- 2nd degree (Seddon's axonotmesis): axonal continuity is lost and wallerian degeneration sets in distally. Mainly seen in crush injury.The prognosis is good because of the preservation of the endoneurinum.
- 3rd degree: the endoneurinal tube is disrupted.
- 4th degree: the endoneurinum and the perineurinum are disrupted and fascicles are no longer segregated.
- 5th degree: the endoneurinum, the perineurinum and epineurinum are disrupted.

Wallerian degenerationand loss of endoneurial structure characterized these lesions. This form of injury has variable and sometimes unpredictable outcome.

To predict the prognosis it is essential to assess the degree of palsy. The classical test for this is the electroneurography (ENoG).It is non-invasive andrelatively easy to use, although it can involve various errors, relating particularly to the use of the surface electrode and to the comparison of the paretic and normal side. Jóri et al[5]have proved that measuring the facial nerve conduction velocity is a more reliable method for prognostic consideration; however because of its invasibility it is not justified for all patients, but can be very useful in bilateral palsy.

Another feature affecting the clinical appearance, unique to facial nerve injury, is the effect of aberrant facial nerve regeneration. This faulty rerouting results in secondary defects such as synkinesis, hemifacial spasm, contracture, hyperacusis, crocodile tears and dysgeusia. The phenomenons of secondary defects contribute to overall disfigurement and decreased quality of life therefore theyare difficult to ignore in an overall assessment of the facial nerve function[6,7].Despite of their prominent nature some grading systems do not address secondary defects.

1.5 Measurement of facial movements, the facial nerve grading systems

When assessing the function of the facial nerve, it is important to measure disability from the onset to various stages of recovery and to detect changes over time or after treatment.In the

past few decades several, internationally accepted systems have been proposed by different authors, yet most of the existing grading systems are subjective. Due to the lack of objectivity, overall assessment of the facial function in a consistent manner has proven to be difficult.

The subjective scales have two main types. Gross scales with an overall impression of facial nerve function have been proposed by House-Brackmann[6,8], May et al [9]and Peitersen[10]. Regional weighted and unweighted scales – like the Yanagihara[11] and the Sunnybrook[12]Grading Scale – evaluate different areas of the face, grade each individual facial movement and then summarize the grades.The main drawback of these scales is that – as with any evaluation involving subjective examination – interobserver variability is particularly difficult to overcome in the assessment of the face:subtle differences in skin wrinkles and surface contour may confound the application of distinct gradations.

In an attempt to address the shortcomings of subjective scales several objective scales – based exclusively on measurement – were developed like the Stennert[13], the Burres-Fisch[14] and the Nottingham systems[15]. However, they often involve the need for precise measurements and mathematical calculations, are complicatedand time-consuming thus impractical to be used in the everyday otolaryngology practice.

1.6 New objective methods for evaluating the facial nerve palsy

Anobjective international standardised method, which is easy to perform at a low cost and with a minimal requirement regarding time and equipments can bea useful clinical tool to monitor clinical changes in subjects with facial palsy. It can also be used to measure results in randomised trials of the treatment of facial palsy and to assess post-operative facial palsy when performing clinical audit after skull base surgery.
The Glasgow Facial Palsy Scale (GFPS) is a recently developed, objective and quantitative assessment of facial palsy, developed by Brian O'Reilly et al.[16],[17]. It is based on the digital processing of a video recording. Based on the authors' experience this method provides a faster and simpler measurement opportunity compared to earlier objective methods.

1.7 Conservative management of facial nerve palsy

1.7.1 Bell's palsy

Bell's palsy is the most common acute mononeuropathy and is the most common cause of acute facial nerve paralysis. The largest (18 trials involving 2786 patients) current systematic

review and meta-analysis for pharmacologic treatment concluded thatcorticosteroids effectively reduce the risk of an unfavourable outcome in Bell palsy[18]. Antiviral agents, when administered concurrently with corticosteroids, may result in additional benefit.Evidence of the effectiveness of corticosteroids appears to be stronger than that of antiviral drugs, and they tend to be most effective when given within three days of the appearance of symptoms. Another large randomized, double-blind, placebo controlled multicenter study made between 2001-2006 by Mats Engström et al [19]showed that patients who received corticosteroid had a shorter time of complete recovery and their outcome at 12 months were more favourable than that of those who did not receive prednisolon. Valaciclovir was not proven to be effective and did not influence corticosteroid treatment.

1.7.2 Management of the eye

The most dangerous complication of facial nerve injuries is the paralysis of the orbicularis oculi muscle with implication for the lid closure. Normal eyelid closure consists in 85% of the upper lids lowering and in 15% of the lower lid elevation. The lagophtalmus and the consequent corneal exposure with the interruption of the tear film may result already in short term in various ophtalmologic complications from simple ocular discomfort to the loss of vision. Therefore it is of paramount importance in case of facial nerve injury (due to any cause) that the management of the paralysis includes provisions for adequate corneal coverage. In case of temporary palsy the prior ophthalmologic treatment is conservative and symptomatic such as ophthalmic drops and ointment, moisture chambers and taping of the lower lid into proper position[20]. In case of severe lagophtalmus temporary lid loading using external weights can be useful[21].

1.8 Surgical management of the facial nerve palsy

1.8.1 Dynamic and static facial reanimation

Severe and long-standing facial paralysis leads to a significant deterioration in quality of life (QOL) owing to serious esthetic and psychological impairments. Surgical rehabilitation aims at restoring the symmetry of the face not only during rest but also during emotional and voluntary motions such as smiling and eye closure. Different procedures of dynamic reanimation have been attempted, such as nerve transposition with the hypoglossal nerve[22,23, 24, 25, 26, 27] orwith the accessorius nerve[28]; cross-face nerve graft [29, 30] that could beassociated to the „babysitter" technique [31], muscle transposition (temporalis, masseter) [32, 33, 34, 35], and free

muscle flap [36, 37, 38, 39, 40,41]. Lengthening temporalis myoplasty and hypoglossal-facial (XII-VII) coaptation are both popular techniques, although no procedure achieves perfectcosmetic results. Evaluation of the results remainscontroversial because surgeons tend to overestimate thesuccess of the surgery. Results are heterogeneous astheir analysis involves different grading systems andthe available scales were developed to grade facialpalsy rather than the result of facial rehabilitation.

1.8.2 Reanimation of the eyelid function

Surgical intervention may be required for patients whose temporary palsy did not recover after several month and the eyelid closure is still not complete, whom have failed the medical therapy and have ophthalmologic complications and in case of definitive palsy. In Hungary lateral tarsorraphy is the classical and most frequently used surgical method to provide corneal coverage. Although this procedure is easy to perform, it has many limitations: provides poor corneal protection, the result is cosmetically unsatisfactory and limits the vision[42]. Another simplesurgical method which can be applied as a temporary solution is the central tarsorraphy which provides a good corneal coverage, but its aesthetic outcome is worsewhile causesmore significant visual limitation than lateral tarsorraphy. In the past decade the management of the lagophtalmus has significantly improved worldwide. The most popular and widely used static procedure is the upper lid gold weight implantation which can be coupled with lateral canthopexy in case of notable ectropion.

2 AIMS OF THE THESIS

2.1 Introduce a new diagnostic and therapeutic protocol

Our goal is to build a standard facial nerve palsy questionnaire which is available in everyday practice, simple enough for use in an ordinary Hungarian ENT department and covers the following areas:

1. Patient's data
2. Questions about aetiology and risk factors
3. Result of physical examinations and facial tests
4. Result of objective and subjective measurements to evaluate the grade of the palsy
5. Which treatment the patientreceived
6. Results of the regular follow-ups

At the same time we also set off to provide a new therapeutic protocol to standardize the treatment of the acute unilateral facial nerve palsy.

2.2 Introduce a new, objective facial grading system

The Glasgow Facial Palsy Score is a recently developed objective computerised method for the evaluation of the facial nerve function. By introducing this new facial grading system for the first time in Hungary, our objective was to compare the results obtained from this method with those obtained by traditional clinical methods accepted in different parts of the world.

2.3 Compare the different surgical methods of the facial reanimation in case of irreversible facial nerve palsy

The purpose was to compare end-to-end and end-to-side XII-VII coaptation with lengthening temporalis myoplasty in the rehabilitation of facial palsy. The results were graded by 2 panels, one of ear, nose, and throat surgeons and plastic surgeons, and the other a nonmedical jury, using the above grading systems and other evaluations of the face. In addition, patients self-assessed QOL after the surgery.

2.4 Introduced new management options in the treatment of paralytic lagophtalmus and ectropion

In the past decade the management of the lagophtalmus has significantly improved worldwide and the most popular and widely used static procedure is the upper lid gold weight implantation which can be coupled with lateral canthopexy in case of notable ectropion. The authors refer about their first experience with these two surgical methods in Hungary.

3 METHODS

3.1 Facial Palsy Questionnaire

In the current medical practice usage of protocols and questionnairesis becoming more and more common. This also applies to the management of the facial nerve palsy where there are several international examples for the usage of such standard protocols, amongst others, in France. At present in Hungary the evaluation and treatment methods of the facial nerve palsy are strongly dependent on the individual preferences and unique experience of the person the patient first meets. This ad-hoc approach makes it nearly impossible to scientifically evaluate the efficiency of the applied treatment methods, it leaves a greater margin for errors and on the end lessens the patient's chances of recovery. Consequently, thereis a significant need to standardize the diagnostic steps and the therapy applied by developingand applying a new protocol.

I set out to develop this new protocol using my international experience as a baseline.My aim was to include in this protocol the criteria mentioned above (section 2.1): aetiology, risk factors, case history, result of the physical examination, facial test and grading system and treatment's options. As the patients need to be followed up, the questionnaire (Appendix 1) also included a follow up section. The questionnaire was part of theseparately created treatment protocol which was made available for all residents and nurses in the in-patient department. As many patients with sudden, unilateral facial palsy arrive during the night and week-end, the protocol let all medical staff know what they should do with the patient(Appendix 2).Thisprotocol also helped our scientific work to compare the therapeutic outcome of the different patient populations.

3.2 Subjective and objective evaluation of facial nerve palsy

In the Facial Palsy Questionnaire I used three subjective and two objective staging systems to assess the grade of the facial palsy at the first examination and later on to measure the recovery at the regular follow-up visits.

3.2.1 Subjective facial nerve grading scales

The commonly accepted gross scale is the House-Brackmann Grading Scale (HBGS)[6] which is the standard adopted by the American Academy of Otolaryngology Head and Neck Surgery (Table 2.).

Table 2.House-Brackmann Grading Scale

I	Normal symmetrical function in all areas
II	Slight weakness noticeable only on close inspection Complete eye closure with minimal effort Slight asymmetry of smile with maximal effort Synkinesis barely noticeable, contracture or spasm absent
III	Obvious weakness but not disfiguring May not be able to lift eyebrow Complete eye closure and strong but asymmetrical mouth movement with maximal effort Obvious but not disfiguring synkinesis, mass movement or spasm
IV	Obvious disfiguring weakness Inability to lift brow Incomplete eye closure and asymmetry of mouth with maximal effort Severe synkinesis, mass movement or spasm
V	Motion barely perceptible Incomplete eye closure, slight movement corner mouth Synkinesis, contracture and spasm usually absent
VI	No movement, loss of tone, no synkinesis, contracture or spasm

It requires the subject to perform a series of movements which are clinically assessed and subjectively assigned to an overall grade from Grade I (normal) to Grade VI (no movement). It has the advantage that it is quick and easy to perform, does not require any technology and produces a single figure description of facial function. The main disadvantages are that as it requires a subjective evaluation of movement there is intra and inter observer variation and that a single overall figure does not allow for assessment of regional differences in function[43]. Also as it categorises motor function jointly with secondary defects the presence of synkinesis limits the assessment to Grade III or higher.

The Yanagihara Grading Scale (YGS)[11] is the standard method used in the Japanese literature. It is obtained by the subjective assessment of total symmetry at rest and nine different facial movements using a three step grading (0-2-4) which when summated give a scale from 0 (total paralysis) to 40 (normal) (Table 3.). It has the advantage that it separately analyses the different regions of the face[44] but does not take into account any secondary sequelae.

Table 3. Yanagihara Grading Scale

	normal	weak	no motion
1 At rest	4	2	0
2 Wrinkle forehead	4	2	0
3 Close eye normally	4	2	0
4 Close eye forcefully	4	2	0
5 Close eye only on involved side	4	2	0
6 Wrinkle nose	4	2	0
7 Blow out cheeks	4	2	0
8 Whistle	4	2	0
9 Grin	4	2	0
10 Depress lower lip	4	2	0
Total (%)	**40 (100)**	**20 (50)**	**0 (0)**

The Sunnybrook Grading Scale (SBGS)[12]is a composite weighted score from the subjective assessment of resting asymmetry (0 to 2) in three regions with the sum multiplied by five, the voluntary excursion during five standard movements (1 to 5) with the sum multiplied by four and assessment of any synkinesis associated with the same voluntary movements (0 to 4) and summed (Table 4.).

Table 4. Sunnybrook Grading Scale

Resting symmetry		**Symmetry of voluntary movement**					**Synkinesis**			
Eye			no movement	slight movement	mild excursion	movement almost complete	movement complete	none	mild	moderate	severe
Normal	0	**forehead wrinkle**	1	2	3	4	5	0	1	2	3
Narrow	1										
Wide	1	**gentle eye closure**	1	2	3	4	5	0	1	2	3
eyelid surgery	1										
Nasolabial fold											
Normal	0	**open mouth smile**	1	2	3	4	5	0	1	2	3
Absent	1										
less pronounced	1										
more pronounced	1	**snarl**	1	2	3	4	5	0	1	2	3
Mouth											
normal	0										
corner drooped	1	**lip packer**	1	2	3	4	5	0	1	2	3
corner pulled up/out	1										
Resting symmetry score		**Voluntary movement score**						**Synkinesis score**			

TOTAL Voluntary Movement x 4 minus Resting Symmetry x 5 minus Synkinesis

The final score is produced by subtracting the asymmetry and synkinesis scores from the voluntary movement score giving a scale from 0 to a normal result of 100. Because of the large number of assessments and gradings this system is more sensitive to small changes in function and synkinesis in the different regions and has been shown to have good reproducibility[45]. It is however time consuming and as all the assessments are subjective it has the same disadvantages as the House-Brackmann Grading Scale and the Yanagihara Grading Scale.

3.2.2 Objective facial nerve grading scales

The Stennert-Limberg-Frentrup Scale (SLFS)[13]is commonly used in the German literature and has separate scores for paralysis and secondary defects (Table 5.).

Table 5. Stennert- Limberg- Frentrup Grading Scale

Motility score 0-10			**Secondary defect score**		
At Rest			Hyperacusis	yes	no
eyelid difference	<3 mm	>3mm	Dysgeusia	yes	no
ec ectropion	No	Yes	***Synkinesis***		
nasolabial fold less pronounced	No	Yes	forehead eye nasolabial fold mouth chin	yes	no
angle mouth depressed	<3 mm	>3mm			
Voluntary Movement					
forehead wrinkle >50%	Yes	No	more than 3 regions	yes	no
lagophthalmos moderate effort	No	Yes	***Spasm***		
lagophthalmos maximum effort	No	Yes	Moderate	yes	no
upper and lower canine teeth visible	Yes	No	Severe	yes	no
all 2nd upper incisor visible	Yes	No	Disturbing	yes	no
Philtrum/angle ditance shortening with whistle	>50%	<50%	***Lacrimation***		
			< 30%	yes	no
			<30% on complete eye closure	yes	no
			0%	yes	no
			Contracture	yes	no
			Crocodile tears	yes	no
Paresis index:			**Secondary defect index:**		

The paralysis score is obtained by a combination of comparisons with the normal side of the resting tone in the four regions of the face plus comparisons of six motility assessments during voluntary movements each with score of 0 for similar and 1 for significantly worse than the normal side. Added together a result of 0 is normal and 10 a total paralysis. The secondary defect score is obtained by assessing the presence or absence of seven separate symptoms. As most of the assessments result in a binary "Yes/No" value, the scale has low observer variability but is time consuming to use.

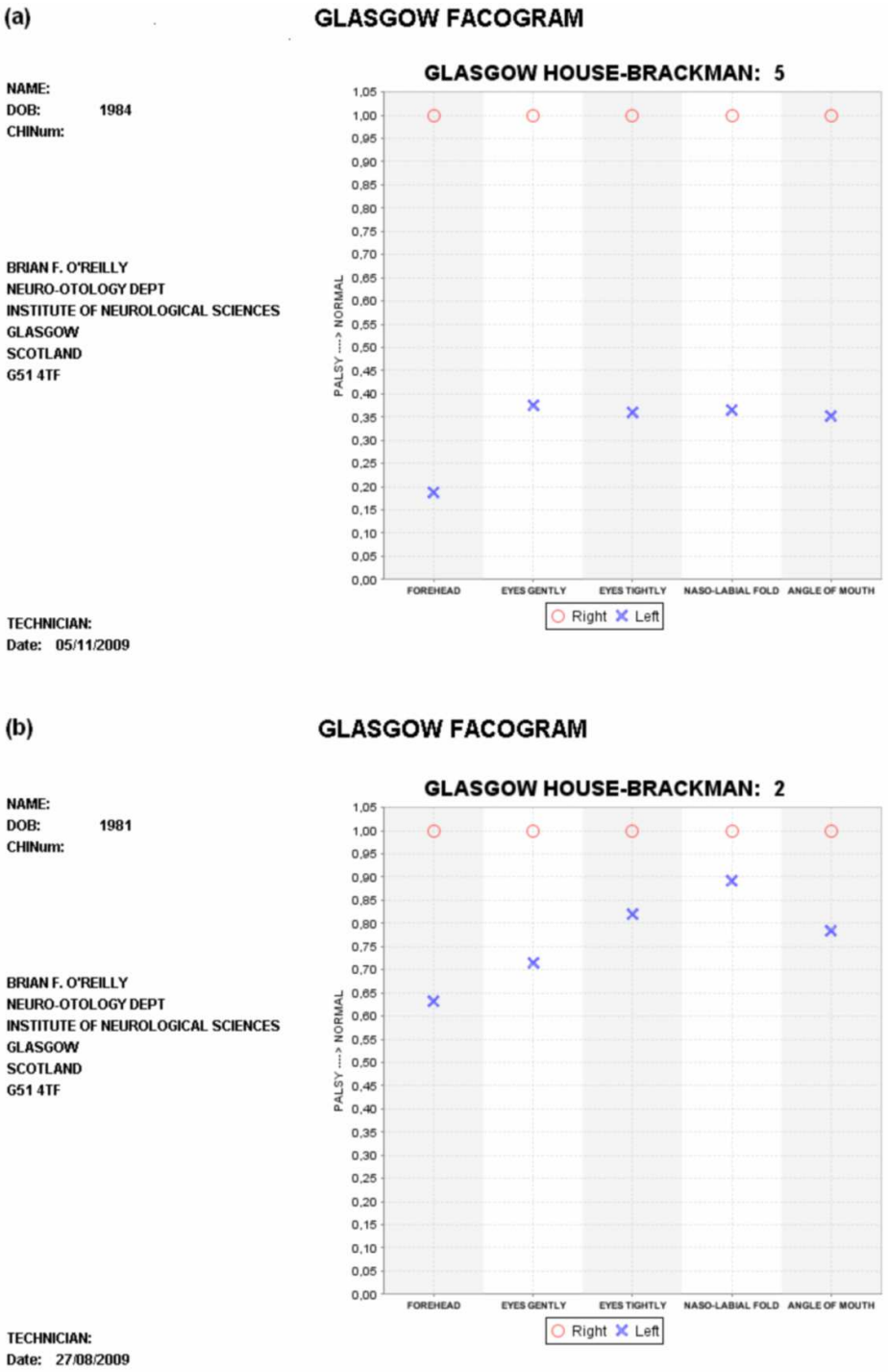
3.2.3 Glasgow objective facial nerve grading system

The Glasgow Facial Palsy Scale (GFPS) is a recently developed objective method of measuring both the House-Brackmann grading and the movement in the different regions of the face. A computer programme is used to automatically measure the pixel changes in both sides of the face produced during 5 standard movements. Using a Sony Handycam DCR-PC105E camera each subject had a video recorded while performing the five movements: raise eyebrow, close eye gently, close eye tightly, screw-up nose and full smile. The data from the camera was passed via a FireWire cable with 4pin 1394 FireWire sockets to a 1.73-GHz Laptop preloaded with the Glasgow Facial Palsy Scale program which analysed the pixel changes in the video. The pixel changes on the palsied side of the face are compared to those in the corresponding regions of the normal side.

Specially trained Artificial Neural Networks are then used to assess the relationship of the pixel changes to the clinical grading of not only the House-Brackmann overall function but also the function in the different regions of the face[17]. By using this system it is possible to produce a consistent objective measurement of the overall House-Brackmann grading and also the movement of the different regions of the face. For ease of interpretation in a clinical setting the results are presented in a form similar to an audiogram with the regional standard movements rather than frequencies along the x axis and the degree of palsy rather than decibels on the y axis. A Facogram graph can then be produced in a similar time taken to produce an audiogram. Examples of a moderate and a severe palsy are shown in Fig. 1.

Fig.1. Glasgow Facogram

a: Left severe facial palsy - HBGS Vb: Left moderate facial palsy - HBGS II



The programme is automated and as there is no requirement for facial markers, head fixation or special lighting the assessment can be carried out in a clinical environment by an audiometrician or audiovisual technician. A later version of the program will accept an input from any camera that Windows XP or higher recognises and has a MiniDV digitaltape format output via a FireWire.

3.3 Study population

3.3.1 Glasgow Facial Palsy Scale

Over a six month period 40 consecutive subjects with a unilateral facial palsy attending a tertiary referral clinic were recruited for testing. The subjects were 28 females and 12 males aged between 8 and 82 years with a mean age of 52. The aetiology of the facial palsies is shown inTable 6.

Table 6. Aetiology of palsy

Aetiology	**Number**
Bell's palsy	29
Postoperative	6
Ramsay-Hunt syndrome	4
Temporal bone fracture	1
Total	**40**

Consent was obtained to store and analyse video recordings of the subjects.

3.3.2 Facial reanimation

42 patients underwent reanimation surgery for facial palsy from 1998 to 2005 in the Lariboisiere Hospital in Paris. Patients had complete and irreversible facial palsy largely secondary to cranial base surgery or secondary to middle ear cholesteatoma surgery, parotid tumor extirpation, or temporal bone fracture. The cause was idiopathic in one case (Table 7.).

Table 7. Etiology of the facial palsy in 42 patients

Aetiology	End-to-end	End-to-side	Myoplasty
Vestibular schwannoma	8	11	2
Facial nerve schwannoma	2	1	0
Geniculate ganglion hemangioma	0	1	2
Other intracranial tumors	2	1	3
Middle ear cholesteatoma	3	1	0
Parotid surgery	0	0	2
Temporal bone fracture	1	1	0
Idiopathic	0	0	1
Total	**16**	**16**	**10**

Facial rehabilitation involved lengthening temporalis myoplasty(n = 10) or XII-VII coaptation (n = 32) by either classic end-to-end (n = 16) or end-to-side coaptation with interpositional jump graft (technique of May et al.[24]; n = 16). Indications for myoplasty were a facial palsy occurring after parotid tumor extirpation or for the long-standing facial palsy. For this reason, mean duration of facial palsy (interval between the onset of the palsy and rehabilitation) was higher in patients undergoing myoplasty than coaptation (6.4±10.33 versus 0.82±1.4 yr, respectively). The mean follow-up was 115.75±56 months for the end-to-end coaptation, 38.1±15 months for the end-to-side coaptation, and 43.9±26 months for myoplasty.

3.3.3 Lateral canthopexy and upper lid gold weight implant

Between July 2009 and December 2009 we performed lateral canthopexy and upper lid gold weight implantation on three patients.

The first patient was a 69-year-old male patient with right malignant parotid tumour (undifferentiated spindle cell carcinoma) and preoperatively intact facial function. In March 2008 we performed a total parotidectomy and right selective neck dissection of lymph node I-IV with the sacrifice of the facial nerve. The patient is clinically tumor-free since the intervention. Due to the development of lagophtalmus he used, on a daily basis, artificial tears and corneotrophical gels, protective eye glasses and occlusive dressing for the night. His lagophtalmus associated with a gradually more and more pronounced ectropion lead to recurrent conjunctivitis (Fig.2).

Fig.2. Conjuctivitis secondary to paralytic lagophtalmus and ectropion

In this situation we proposed to perform lateral canthopexy and upper lid gold weight implantation. As the cost of the gold implant is not subsidized by the Hungarian social insurance agency we performed first the correction of ectropion by lateral cantopexy. After the canthopexy, along with continued conservative and symptomatic treatment, the patient had no more conjunctivitis, but the eyelid closure was still insufficient. As a second step we performed the more expensive gold weight implantation. The appropriate weight was selected for the patient preoperatively: the different weights (0,8-1,4 g) were placed temporarily on the upper lid below the superior limbus with the eye open.A slight overcorrection is desirable since the levator muscle appears to strengthen postoperatively.

Our second patient was a 51-years-old female patient with adenocarcinoma of the left parotid gland. We performed total parotidectomy and supraomohyoid neck dissection with the resection of the facial nerve in November 2007, the patient is tumor free since the intervention. Even though her postoperative lagophtalmus and ectropion did not cause any ophthalmologic complication with the regular use of ointments and eye drops, she was disturbed by the dysfunction and its aesthetic consequence. The patient – after being thoroughly informed about the possible surgical reanimation methods – chose to undergo only the lateral canthopexy as the initial treatment which we performed in August 2009. After the intervention her eyelid-closure became considerably better, but still not complete (Fig.3.). Thus nine month later after a preoperative weight selection (Fig.4.) we also performed the gold weight implantation.

Fig.3. Eyelid closure after lateral canthopexy

Fig 4. *Preoperative weight selection*

The third patient was a 51-years-old man who went through two parotid surgeries because of recidive pleomorphic adenoma of the right parotid gland: lateral lobectomy in 1995 and total parotidectomy in 2006 in abroad. Since the second intervention he had definitive facial nerve palsy. We first met him because of a new recidive of his pleomorphic adenoma which we removed in September 2009. We performed lateral canthopexy and gold weight implant in December 2009 because of incomplete eye closure (Fig.5.).

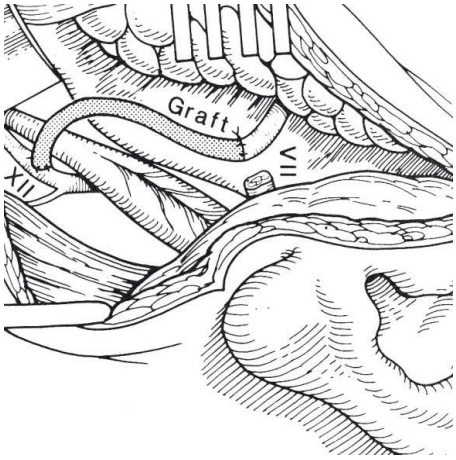
Fig.5. Preoperative eyelid closure

3.4 Surgical techniques

3.4.1 Hypoglossal-facial nerve anastomosis

All surgical procedures were performed by 3 senior head and neck surgeons with a broad experience in the management of facial palsy rehabilitation.

Fig.6. *XII-VII jump anastomosis*



For the end-to-end XII-VII coaptation, the ipsilateral hypoglossal nerve was divided as distally as possible, transferred toward and sutured to the trunk of the facial nerve in the parotid area.

For the end-to-side coaptation with interpositional jump graft a cable nerve graft involving the greater auricular nerve was interposed between the distal facial nerve and the hypoglossal nerve (Fig.6.).

The partial section of the hypoglossal nerve (30 to 50%) was performed beyond the descendent hypoglossal branch to reduce grimacing or facial movement during swallowing (Fig.7-8.)

Fig.7.End-to-side hypoglosso-facial anastomosis

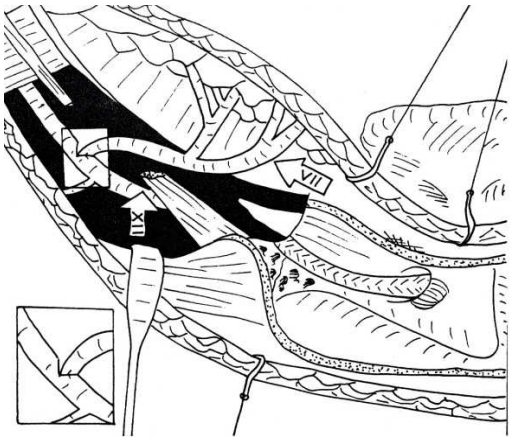
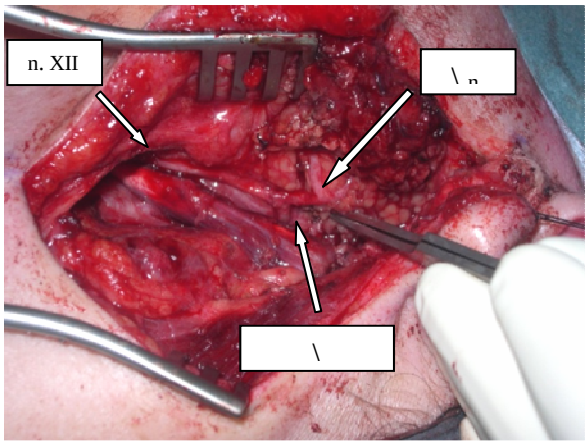


Fig.8. Intraoperative picture of an end-to-side anastomosis

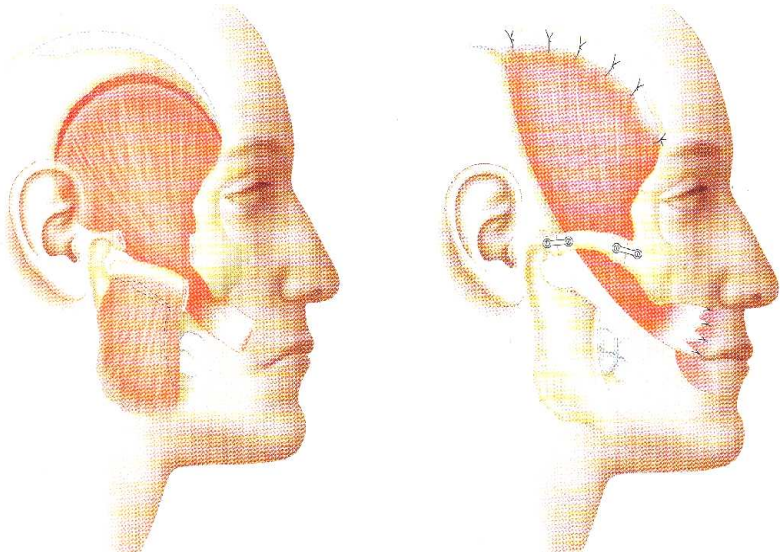


3.4.2 Temporalis myoplasty

For lengthening temporalis myoplasty as described by Labbe[33,34], the temporalis muscle was separated from the temporal fossa and was mobilized. Its tendon was detached from the

coronoid process and sutured to the subcutaneous tissues of the superior lip and to the modiolus through a nasolabial incision, respecting the deep arterial temporal pedicles (Fig.9).

Fig.9.Temporalis myoplasty- technique of Labbé



3.4.3 Eyelid reanimation

Lateral canthopexy: in local infiltration anaesthesia a small subciliary incision was made in the lower lid crease laterally, the lateral palpebral ligament was identified and firmly attached by non-absorbable suture to the periosteum on the inner aspect of the orbital rimto shorten and tighten the lower rid (Fig 10.). To finish the surgery and to decrease the skin excess wedge excision of the lateral lower eyelid was performed.

Fig.10. The lateral palpebral ligament is identified and attached by non-absorbable suture to the periosteum on the inner aspect of the orbital rim to shorten and tighten the lower rid

Upper eyelid gold weight implant: the pre-existing eyelid crease is marked 3-4 mm from the upper lid margin with fine-tip marking pen just slightly wider than the width of the gold weight. In local anaesthesia we perform a 2,5 cm incision through the skin and subcutaneous

tissue and by blunt dissection we create a pocket which will accommodate the weight between the orbicularis oculi muscle and the tarsus (Fig.11.). The gold weight is placed then in this pocket and fixed to the tarsus with 5-0 synthetic monofilament suture through each of the three holes. The wound is closed in two layers using 5-0 polyglactin for the deep layer and running 6-0 nylon suture for the skin.

Fig. 11. 2,5 cm incision through the skin and subcutaneous tissue and by blunt dissection creation of a pocket which will accommodate the weight between the orbicularis oculi muscle and the tarsus

3.5 Evaluation

3.5.1 GFPS versus classical grading systems

3.5.1.1 Medical jury

The videos were then also individually assessed by 3 independent ENT Specialists (Drs K.G., R.L: and SZ.B.) who graded each subject using the subjective House-Brackmann Grading Scale, Yanagihara Grading Scale and Sunnybrook Grading Scale and the objective Stennert-Limberg-Frentrup Scale.

3.5.1.2 Statistical analysis

The results obtained from the subjects with the computerised Glasgow Facial Palsy Scale assessment were compared to the 4 standard clinical methods of assessing facial palsy by plotting the results on individual scatterplots. A One-sample Kolmogorov-Szmirnoff test was applied to assess the presence of a normal distribution. The Pearson correlation coefficient was measured in the presence of a normal distribution and the Spearman correlation coefficient measured in the presence of an abnormal distribution (Statistica 8.0 software). In both methods the linear correlation coefficient (r) measures the strength and direction of any relationship between the two variables**.**

3.5.2 Facial nerve reanimation surgery

3.5.2.1 Medical and non-medical jury

For the evaluation of the results of surgery, a video of the patient was recorded with the face at rest, during voluntary motion of the 10 groups of facial muscles, during expression of the 6 main emotions (happiness, sadness, anger, disgust, surprise, and fear), and during a short free conversation that allowed evaluation of spontaneous expression. Medical and nonmedical juries then evaluated the recording. The medical jury consisted of three ear, nose, and throat surgeons and two plastic surgeons. The nonmedical jury included four people selected according to their ability to analyze the cosmetic appearance of a face; a cameraman, a filmmaker, anesthetician, and an artist painter. Both juries were blinded to the procedure used. The medical jury evaluated the facial rehabilitation using 4 classic systems to grade the face: House-Brackmann[8], Sunnybrook[12], Yanagihara[11], and Freyss[22,46](Tables 2-4, 8.).

Table 8. Freyss score for the motility of 10 muscular groups (0-3)

G1	Frontales muscle
G2	Corrugator muscle
G3	Procerus muscle
G4	Orbicularis oculi muscle
G5	Levator labii muscle
G6 Zygomaticus muscle	
G7	Orbicularis oris muscle
G8	Buccinator muscle
G9 Mentalis muscle	
G10	Depressor labii inferioris muscle

3.5.2.2 Patient's evaluation

Other evaluations involved scoring the face at rest and during voluntary motions and emotional motions on a scale from 1 to 10. The nonmedical jury used the last 3measures to evaluate the face. We mailed 2 well-established questionnaires, the Facial Disability Index (FDI)[47, 48] and the Glasgow Benefit Inventory (GBI)[49], as well as a Quality of life(QOL) questionnaire developed in our institution, to each patient(Table 9).

Table 9. Institution's QOL questionnaire

1. **Disability in professional life**(0 = no handicap to 10 = severe handicap) □ Before reanimation □After surgery
2. **Disability in private life**(0 = no handicap to 10 = severe handicap) □ Before reanimation □ After surgery
3. **Index of satisfaction**(0 = not satisfied to 10 = very satisfied) □
4. **Was the surgery useful?** □Yes □ No. Why?
5. **Would you undergo the operation again?** □ Yes □ No. Why?

The FDI asks 10 questions regarding physical and social activities such as the ability to brush teeth,eat, and speak; additional questions ask regarding cornea protection, isolation, irritability, social activity and sleeping disorders. The GBI evaluates the effects of surgery with 15 questions regarding social well-being and 3 regarding medical side effects. The institution's questionnaire evaluates disability in T5 professional and private life and general satisfaction.

3.5.2.3 Statistical evaluation

The sex, age, and number of patients in the 3 treatment groups were compared (analysis of variance [ANOVA] and χ_2). Then, ANOVA and Fisher's exact test were used to analyze the relationship between facial palsy duration and quality of recovery. Treatment effects were compared by the lapse time between the surgical procedure and the initial evidence of recovery, scores on the 5 grading scales, and the other scores given by the medical and nonmedical juries and the self-assessment by the patients. A $p<0.05$ was considered statistically significant. The predictive value for the ability of the grading system to discriminate the different procedures was also analyzed.

3.5.3 Eyelid reanimation

Statistical analysis is planned when the study population reach at least 15 patients.

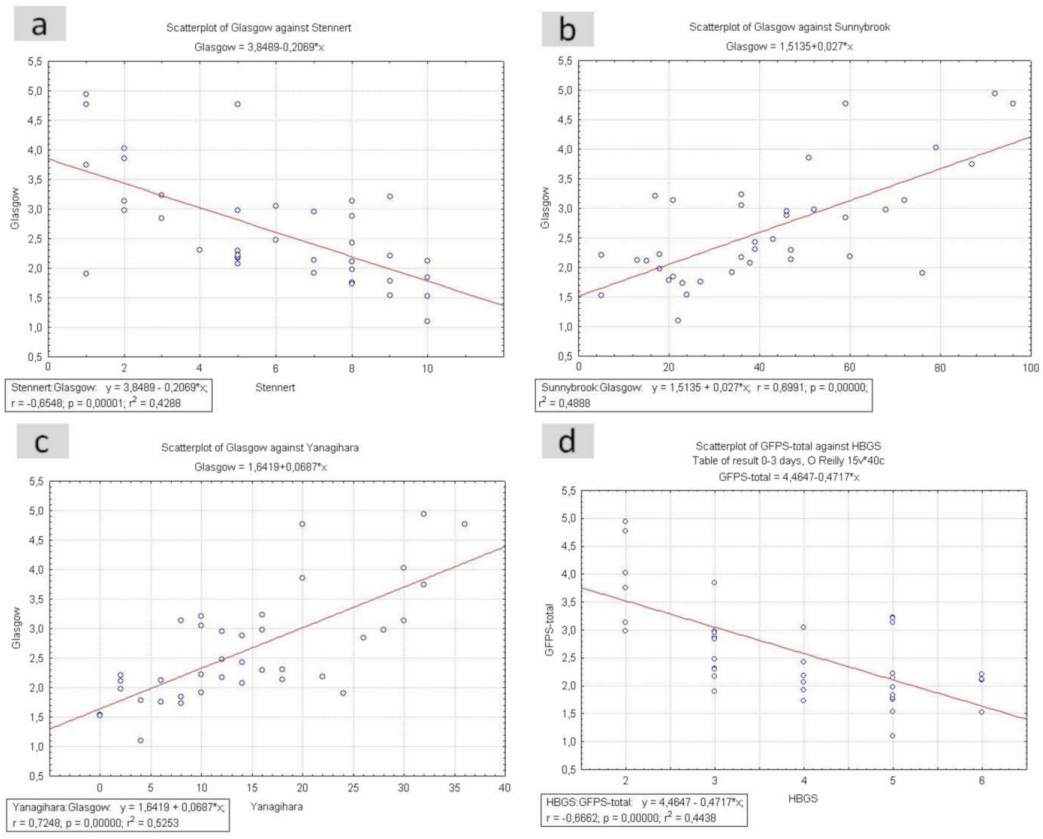
4 RESULTS

4.1 Comparison between Glasgow Facial Nerve Palsy scale and four classical, widely used objective and subjective facial grading scales

Comparison of the GFPSwith other methods are shown in the Scatterplots in Figure12.

Fig.12. Scatterplot analysis of the GFPS vs SLFS (a), GFPS vs SBGS (b), GFPS vs YGS (c) and GFPS vs HBGS (d)

Linear correlation coefficient (r) measures the strength and the direction of the linear relationship between the different clinical methods. r=1perfect, 0.7 ≤ r <1 strong, 0.2≤ r <0.7 averagely strong, 0 < r < 0.2 weak correlation and r=0 no correlation.



The House-Brackmann Grading Scale data was not normally distributed and had a Spearman's coefficient of 0.64 which indicates an averagely strong correlation between the Glasgow Facial Palsy Scale and the House-Brackmann Grading Scale assessments.

The other standard clinical methods of assessment had a normal distribution with a Pearson's coefficient between the Glasgow Facial Palsy Scale and Sunnybrook Grading Scale of 0.7 and between the Glasgow Facial Palsy Scale and Stennert-Limberg-Frentrup Scale of 0.65, both

showing an averagely strong correlation. The correlation between the Glasgow Facial Palsy Scale and Yanagihara Grading Scale was the strongest with a Pearson coefficient of 0.72**.**

Table 10. Interobserver variability

*Values of **kappa** can range from -1.0 to 1.0, -1.0= perfect disagreement below chance, 0.0= agreement equal to chance, and 1.0= perfect agreement above chance. K**appa of 0 .70 or above=s adequate interrater agreement.***

	House Brackmann Grading Scale	**Yanagihara Grading Scale**	**Sunnybrook Grading Scale**	**Stennert Grading Scale**
Percent of overall agreement	**0,73**	**0,92**	**0,90**	**0,92**
Siegel and Castellan's Fixed-marginal kappa	**0,66**	**0,92**	**0,90**	**0,90**
Randolph's Free-marginal kappa	**0,68**	**0,92**	**0,90**	**0,91**

The consistency of the results from the three assessors is shown in Table 10. There was a low interobserver variation for all the scales apart from House-Brackmann. The reason for this is likely that this scale has the lowest number of options available when making the subjective decision on the the degree of palsy.

4.2 Comparison of different types of hypoglosso-facial nerve anastomosis and temporalis myoplasty

4.2.1 General Characteristics of the Population

Mean age did not differ between the groups (45.7±15.8 yr for the coaptation group versus 51.7±17.7 yr for the myoplasty group; p= 0.26), nor did sex distribution differ (p= 0.41). Mean delay for detecting the first signs of recovery did not significantly differ between the myoplasty group (2±1.1 mo) and the end-to-end coaptation group (5.2±3.5 mo) but it was significantly longer for the end-to-side coaptation group (9.5±6.9 mo;p= 0.017). Approximately half of the patients underwent facial physiotherapy after surgery.

4.2.2 Evaluation by the Medical Jury

Results of the grading systems for each procedure are reported in Table 11. The medical jury rated end-to-side coaptation significantly better than myoplasty by the Sunnybrook grading system (p = 0.03) and end-to-end coaptation better than myoplasty by the Freyss and Yanagihara grading systems (p = 0.018 and p = 0.024, respectively). The jury also rated both end-to-end and end-toside coaptation better than myoplasty by the HBGS (p = 0.037 and p = 0.026, respectively). Thus, end-to-end and end-to-side XII-VII coaptation performed better

than myoplasty according to all grading scales.For the face at rest, the mean score for all procedure groups was 6.5/10, but the score for either coaptation type was not significantly different from that of myoplasty (6.8/10 versus 5.4/10).

Table11. Medical jury mean scores by the 5 grading scales for hypoglossal-facial coaptation and lengtheningtemporalis myoplasty

	House-Brackmann	***May***	***Freyss***	***Sunnybrook***	***Yanagihara***
End-to-end	*3.4*[a]	*2.8*	*6,4*[a]	*30,1*	*14,2*[a]
End-to-side	*3,3* [a]	*3,1*	*5,2*	*32,7*[a]	*12,7*
Myoplasty	*3.9*[a]	*2.6*	*3.4*[a]	*20.8*[a]	*9,9*[a]

[a]p <0.05 between procedures

For the face during voluntary motion, the mean score for all procedures was 4.9/10 and during expression of emotions was 4.8/10 with no significant difference between groups (p = 0.91) as shown in Table 12.

Table 12. Medical and nonmedical jury mean scores for the face at rest and during voluntary motions and expression of emotions for hypoglossal-facial coaptation and lengthening temporalis myoplasty.

	Medical jury			**Non-medical jury**		
	At rest	Voluntary motion	Emotions	At rest	Voluntary motion	Emotions
End-to-end coaption	6,8[a]	4,9	5,0	7,7[a]	5,8[a]	6,0[a]
End-to-side coaption	6,8[a]	4,9	4,8	7,9[a]	6,0[a]	5,8
Myoplasty	5,4[a]	4,8	4,6	6,7[a]	4,6[a]	4,7[a]

[a]p <0.05 between procedures

4.2.3 Evaluation by the Nonmedical Jury

For the face at rest, the nonmedical jury gave a meanscore of 7.2/10 for all procedures; the score was significantlyhigher for the end-to-end and end-to-side coaptationgroups than for the myoplasty group (7.7/10, 7.9/10, and 5.6/10, respectively; p= 0.004 and p= 0.001;Table 12.). The jury noted that disharmony of the face was moreobvious for the myoplasty group and that voluntarymotions were stronger with both coaptation groupsthan with the myoplasty group (5.8/10, 6/10, and 4.7/10,respectively; p= 0.02 and p= 0.006). The jury rankedthe expression

of emotions 6/10 for the end-to-end coaptation group and 4.7/10 for the myoplastygroup, with a significant difference between these 2groups (p= 0.02).

4.2.4 Patient Evaluation

All patients felt less disabled after surgery thanbefore with respect to physical and social impairment,but patients still had some complaints. Indeed, themean score of the FDI was 56/100±27.5 for the physical portion and 69/100±23 for the social portion, with nosignificant difference according to procedure. The GBI results showed a net improvement regardless of procedure (mean score = + 12±20 [max, + 50; min,-50]) (Table 13).

Table 13. Patients' mean scores for QOL questionnaires for hypoglossal-facial coaptation and lengtheningtemporalis myoplasty

	FDI physical (/100)	**FDI social (/100)**	**GBI total (-50/+50)**
End-to-end coaptation	53 (±30.4)	68.3 (±22.6)	11.6 (±22.6)
End-to-side coaptation	62.7 (±14.9)	69.5 (±23)	8.6 (±20.9)
Myoplasty	52.8 (±32.7)	81.8 (±8.3)	19.5 (±18.6)

On our institution's questionnaire, patients consideredthat their daily and professional lives weresignificantly improved ($p<0.001$ and $p<0.02$, respectively; Table 14.). In most cases, patients were satisfied,would consent to surgery again, and thought that surgeryhad been useful.

Table 14.Patients' mean scores for the institution's QOL questionnaire for hypoglossal-facial coaptation andlengthening temporalis myoplasty

	Disability in professional lifebefore surgery (0-10)	**Disability in professional life after surgery (0-10)**	**Disability private life before surgery (0-10)**	**Disability private life after surgery (0-10)**	**Index satisfaction (0-10)**	**Surgery was useful**	**Would undergo the operation again**
Mean score	3,41	1,38	6,75	4,76	6,34	92%	82%
End-to-end coaptation	4,43	1,24	6,22	4,58	6,28	92%	71%
End-to-side coaptation	2,42	2,37	7,18	4,95	6,4	92%	91%
Myoplasty	3,85	2,06	8,88	4,88	7,5	89%	89%

4.2.5 Prognostic Factors

For each surgical procedure, the time between the onsetof the facial palsy and the rehabilitation procedure didnot influence the functional results by the HBGS.

4.2.6 Comparison of the Grading Systems

No significant difference was found in scores betweenthe 4 grading systems.

4.3 Gold eyelid weight and lateral canthopexy

In every case perioperative eyelid oedema and haematoma has appeared which has been dispersed in few days with the use of topically applied corticosteroid and antibiotic. Perfect eyelid closure was observed 14 days after the upper eyelid gold weight implantation (Fig 13. and 14.).

Fig.13. Eye opening and closure on the 14th postoperative day after the gold eyelid weight implantation

Fig.14.Complete eyelid closure two weeks after gold weight lid loading by the 2nd and the 3rd patients

5 DISCUSSION

5.1 Comparison between Glasgow Facial Nerve Palsy scale and four classical, widely used objective and subjective facial grading scales

5.1.1 Synopsis of the key findings

There is a moderately strong correlation between the Glasgow Facial Palsy Scale and House-Brackmann Grading Scale which is to be expected as the artificial neural networks used to produce the Glasgow Facial Palsy Scale are trained with House-Brackmann Grading Scale results assessed by clinicians. The strongest relationship was found between the Glasgow Facial Palsy Scale and Yanagihara Grading Scale which underlines the detailed regional information measured in both systems. The Glasgow Facial Palsy Scale showed a strong correlation with the Sunnybrook Grading Scale and a moderately strong correlation with Stennert-Limberg-Frentrup Scale demonstrating the sensitivity of this objective method when assessing overall facial nerve function.

5.1.2 Strengths and weaknesses

The ideal grading scale for facial nerve function should be objective and simple to measure but have a strong intra and inter observer reliability. It should take into account symmetry at rest, both regional spontaneous and voluntary facial movements and secondary defects. There is no such classification that includes all these criteria but several subjective[8,11,12] and objective [13,50,51] classifications have been proposed.

The Glasgow Facial Palsy Scale is an objective quantitative evaluating method based on the computer analyses of pixel changes during a digital video recording of facial movements thereby eliminating the subjectivity of the observer. The process is quick and has modest technological requirements using a basic laptop computer and a domestic digital video camera. The program is available on the web as open source software. The facogram which is produced automatically demonstrates the individual regional facial nerve functions and can be stored electronically or in a printed form in the case record.

Its drawbacks are that it does not evaluate secondary defects such as synkinesis or tearing but it could be supplemented by simultaneous use of the Stennert's secondary defect score. As the paralyzed side's movement is compared to that on the normal side it cannot be performed in presence of bilateral palsy. The identification of the different regions relies on a normal position of the pupils therefore it cannot be used in the presence of strabismus, oculomotor palsy or an artificial eye.

This thesis concentrated on demonstrating the ability of the objective computerised method to obtain similar results to the accepted clinical methods rather than its ability to track clinical change in the individual patient which has been demonstrated in a previous study[17].

5.2 Comparison of different types of hypoglosso-facial nerve anastomosis and temporalis myoplasty

The largely used techniques for the reanimation of complete and irreversible facial palsy are XII-VII coaptation and lengthening temporalis myoplasty. Classic end-to-end XII-VII coaptation requires a viable distal facial stump and a nonatrophic musculature. Because it induces lingual hemiatrophy, which may sometimes be disabling, some authors have proposed a partial section of the XII nerve with interposition of a greater auricular nerve graft (jump)[24]. XII-VII coaptation never restores spontaneity to the face. Lengthening temporalis myoplasty[33,34] claims overall results superior to the XII-VII coaptation, but no procedure achieves perfect cosmetic results. However, evaluation of the results remains controversial in part because the analysis has involved different grading systems developed to grade facial palsy not facial rehabilitation.

We aimed to compare the results of end-to-end and end-to-side XII-VII coaptation and lengthening temporalis myoplasty as assessed by an expert jury using the four most accepted facial grading systems, by a nonmedical jury and by the patients' own QOL assessments.

XII-VII coaptation, whatever the type, yielded significantly better results than myoplasty, regardless of gradingsystems used by the medical jury and scores given by the nonmedical jury. The most significant and discriminating factor of the myoplasty procedure was an obvious disharmony of the lower face caused by the visibility of the nasolabial scar, the inescapable overcorrection of the superior lip, and the absence of inferior lip rehabilitation which led to a deviation of the inferior lip toward the healthy side. However, the medical jury rated the smile more spontaneouswith myoplasty than with XII-VII coaptation.

The grading systems used could account for the differences, although not significant, we found between both types of XII-VII coaptation. If the grading system took into account synkinesis, as does the Sunnybrook system, results were better with end-to-side than end-to-end coaptation. On the contrary, if the grading system did not take into account synkinesis, such as the Freyss and Yanagihara systems, end-to-end coaptation led to better results. Thus, the difference between the results of the procedures depended on scoring synkinesis in the grading system. End-to-end coaptation – reinnervation by the whole hypoglossal nerve – leads to high motility,but also to adverse effects, such as synkinesis and mass movements[23,27,52].In contrast, end-to-side coaptation leads to a weaker muscle tone, less synkinesis and mass movement and longer recovery because of axonal loss and fibrosis due to the presence of secondary coaptation[23,53,54].

This finding could explain the conclusions of the medical jury who gave better scores for patients with a strong emotional and spontaneous expression if they had undergone end-to-end rather than end-to-side coaptation. Because of the stronger muscle tone provided by the full reinnervation, the mouth is less attracted toward the healthy side. However, patients with a weaker facial expression require less muscle tone thus they had a satisfying outcome with the end-to-side coaptation because of the less important secondary effects. This therefore shows that choosing the most appropriate surgical method must take into account the spontaneous expression of the face.

Patient QOL was improved in general, regardless of the technique, meaning that rehabilitation was guaranteed ([55] and our study). However, the scores from the three patient questionnaires were moderate, so rehabilitation was not perfect. Interestingly, these questionnaires could not discriminate between the effects of XII-VII coaptation and myoplasty. Two biases impair the study of QOL in facial rehabilitation: the GBI questionnairedoes not focus on the analysis of facial motions and patients have difficulties in properly evaluating the benefit of a reconstructive procedure performed at the same time or soon after ablative surgery, which, in most cases, causes facial palsy and also affects QOL.

Comparison of the different grading systems have shown good correlation[6,14,56,,57,58,59,60]especially for grading voluntary movements[61]. Surprisingly, we found that results with the different grading systems were comparable with nonmedical jury evaluations, showing that XII-VII coaptation led to better results than myoplasty. However, these grading systems are not perfectly adapted for the evaluation of facial reanimation,

because secondary healing defects such as synkinesis and mass movements are not well described: forehead motility is evaluated, but it is never reanimated and no system evaluates emotional motions.

5.3 Comparison between lateral tarsorraphy and upper lid gold weight implant in the treatment of paralytic lagophtalmus

Restoration of the eyelid animation and aesthetics are the major component of surgical managementof long-term facial nerve palsy. Tarsorraphy has been the traditionally used method in Hungary because of its simplicity. However besides limiting the vision and offering an insufficient corneal coverage, the procedure may lead to unappealing cosmetic effects. Following the release of the tarsorraphy notching of the eyelid margin or ectropion may occur.

The gold eyelid weight introduced 60 years ago by Sheehan et al[62] is the most widely applied surgical method internationally. Gold weights can be safely implanted in an outpatient setting with local anesthesia. This easy and effective method has also the advantage of being reversible without leaving any defects, thus can also be used for patients with temporary palsy. It reanimates only the paralyzed upper lid; therefore it should be completed if necessary with a lower lid tightening procedure, as it was previously described. To obtain a good result adequate preoperative evaluation is compulsory to determine the optimal size, weight and position of the implant. Custom-made weights are far cheaper and produce a much more aesthetic result than commercially manufactured gold implants. Besides gold[20,63] the implanted material can be tantalum[62], platinum[64]or platinum-iridium[65]. The more popular gold weight which was also used in our department provides satisfactory lid closure in case ofthe vast majority(between 70 to 100% in relevant literature) of patients[42,66,67].Sönmez et al [68] reported that the method offers an aesthetical postoperative appearance from the patient's point of view which was our experience as well. Complications like infection or allergic reaction can occur but have been found infrequent[69].Possible long-term complications are the following: upper eyelid pseudoptosis, under correction, migration, extrusion and astigmatism due to nonconformity of gold weight to the corneal slope. A German meta-analysis [70] investigated publications and presentations of this topic before 2005 and has found the following complication rates: astigmatismus 11,5%, migration 6,4%, extrusion 6,8%, infection 7%. According to Rofagha[63] et al postoperative complications are few, but after 5 years the incidence of weight exposure increases to around 10 percent. Most of the possible

complications can be avoided by proper surgical techniques and a good understanding of periocular anatomy. Pseudoptosis and under correction will not occur either when due attention is given to finding the appropriate weight before intervention while the potential for migration can be lessened by using appropriate tarsal fixation. In our study no complication occurred.

Although gold weight implants are still the most common, since 1999 flexible platinum chain implants has been available as an alternative to the rigid gold implant. Schrom et al[70] are convinced that the platinum chain matches much more the anatomic prerequisites of the upper eye lid and postoperative complications are less frequent. Further lid loading method is the palpebral spring introduced by Morel-Fatio et al in1964[71]. According to Terzis et al gold weight and palpebral spring are both efficient in restoring motion to the paretic upper eyelid, but the palpebral spring is more so despite the frequent need for revisions[72]. It is an effective treatment for lagophthalmos, even though has a high rate of extrusion[73].

To restore the maximal eyelid function in addition to the upper eyelid weight implant the management of lower lid drooping is crucialas well. When the patient cannot afford the price of the gold weight and have only a small problem of occlusion, canthopexy alone can be considered as the primary intervention. Merely the tightening of the lower lid can already enhance the occlusion. Evidently gold weight lid loading can be always performed later on if necessary.

In our interventions we opted not to use the commercially available implants due to their high cost and the sometimes cumbersome and expensive ways of importing them to Hungary. Instead, we used customized 99,99% pure gold implant manufactured by a private jeweller.

6 CONCLUSIONS AND NEW RESULTS

6.1 Glasgow Facial Palsy Score

The most common situation for a clinician wishing to measure and record facial weakness is the clinical monitoring of Bell's palsy. This objective programme is ideal for this and also applicable when comparing results of treatment in double blind trials and in the clinical audit of skull base surgery. The authors are preparing a new study to monitor clinical changes in subjects with facial palsy by comparing the results obtained from the objective computerised method with the results obtained by the standard subjective clinical methods of the House-Brackmann Scale, Yanagihara, Sunnybrook grading scales and the objective clinical Stennert-Limberg-Frentrup scale.

6.2 Facial reanimation methods

Fully restoring facial function and emotions after facial palsy remains challenging. The choice of the appropriate surgical rehabilitation procedure must rely on a detailed analysis comprising the facial palsy duration, the cause of the facial palsy, the presence of other cranial nerve injuries, the spontaneous expression of the healthy side, and the motivation of the patient. We suggest that XII-VII coaptation should be preferred over temporalis myoplasty for facial palsy whenever possible because it provides better results with the face at rest while motions with both procedures are comparable.

6.3 Eyelid reanimation in facial nerve palsy

As the funtional and cosmetic results of the combination of gold eyelid weight and lateral canthopexy significantly surpass those of the lateral tarsorraphy this should be the primary treatment in case of paralytic lagophtalmus. Customized gold eye weights offer a good and lot cheaper alternative against commercially available ones.

6.4 New results

The conclusion of our paper on thecurrent diagnostic, pharmaceutic and reconstructive surgical methods in the management of facial nerve palsy is that there is ahuge demand for a facial nerve palsy protocol to compare the results of different workgroups and methods. The international literature available on this topic reflects the same problem: different patient

groups are evaluated and treated with different methods so metaanalysis of the results is not possible. In an attempt to address this gap:

- We have introduced a suitable complex questionnaire containingaetiology, risk factors, case history,result of the physical examination, facial test, different subjective and objective measurements and treatment options.
- We have established a new therapeutic protocol to standardize the treatment of the acute unilateral facial nerve palsy.
- For the first time in Hungary, we used a new, quick, objective, quantitative method – the Glasgow Facial Palsy Score – which could be easily applied to daily clinical routine (II,III).
- Based on myforeign clinical experience and derived from the surgical results of our French colleagues we compared three different facial reanimation techniques (IV).
- For the first time in Hungary,we introduced and accomplished the use of simple surgical methods already proven abroad for the treatment of lagophtalmus and ectropion secondary to facial nerve palsy(I).

6.5 Future

For the future we have the following ideas to realize:

- We would like to develop a new facial palsy score with which the results of the facial reanimation could be also analysed.
    - We propose that the facial function should be evaluated according to
        - the symmetry at rest at the fronto-orbital (mention of the eye surgery), nasal and labial regions,
        - the voluntary motions (eye closure, smile, whistle, lower lip depression and grin),
        - the 6 main emotions and
        - the spontaneity.

- Secondary defects such as synkinesis, mass movements, hemispasm and the side effects (tongue motility, problems of swallowing and mastication) must be also described.

- We would like to continue to perform eyelid reanimation surgery and do statistical analysis of our long-term results

7 ABBREVIATIONS

ANOVA: Analysis of variance

ENT: Ear-Nose-Throat

ENoG: Electroneuronography

FDI: Facial Disability Index

GBI:Glasgow Benefit Inventory

GFPS: Glasgow Facial Palsy Scale

XII-VII: Hypoglossal-Facial

HBGS: House-Brackmann Grading Scale

QOL: Quality of life

SBGS: Sunnybrook Grading Scale

SLFS: Stennert-Limberg-Frentrup Scale

YGS: Yanagihara Grading Scale

8 APPENDIX

8.1 Facial Palsy Questionnaire

Beteg neve: Életkora: Azonosítója:
Címe:
Foglalkozás: Elérhetőség:
Mikor következett be a FP: Első orvosi ellátás időpontja:

Anamnézis:
□Láz
□influenzaszerű tünetegyüttes
□stressz
□koponyatrauma
□kullancscsípés
□huzat vagy meghűlés (hidegben tartósan tartózkodás)
□egyéb:……

KÍSÉRŐ TÜNETEK:

Csecsnyúlvány feletti fájdalom	□ nem	□ igen	
Bőrkiütés	□ nem	□ igen	
Arcduzzanat	□ nem	□ igen	
Könnyezés	□ nem	□ igen	
Szemszárazság	□ nem	□ igen	
Ízérzés zavar	□ nem	□ igen	
Hyperacusis	□ nem	□ igen	
Fülzúgás	□ nem	□ igen	
Hallászcsökkenés	□ nem	□ igen	(□kezdetben □ >24h)
Forgó jellegű szédülés/bizonytalanség érzet	□nem	□ igen	(□kezdetben □ >24h)
Nystagmus	□ nem	□ igen	
Facialis hypoesthesia	□ nem	□ igen	(□kezdetben □ >24h)
Fejfájás	□ nem	□ igen	(□kezdetben □ >24h)
Nyakfájdalom	□ nem	□ igen	
Dysphonia	□ nem	□ igen	

Egyéb neurológiai tünet: …….

Herpeses anamnézis:	□ nem	□ igen
Herpes fertőzést felvető klinikai tünetek:		
labialis hypoesthesia	□ nem	□ igen
labialis dysesthesia	□ nem	□ igen
eruptio	□ nem	□ igen

Korábbi FP epizód:	□ nem	□ igen

Ideje:
Oldal:
Maradványtünetek:

KORÁBBI ANAMNÉZIS-EGYÉB BETEGSÉGEK

Gastroduodenalis ulcus	□ nem	□ igen
Alkoholos májcirrhosis	□ nem	□ igen
Immunszupprimált állapot (transzplantatio, HIV, vérképzőrsz.bet.)	□ nem	□ igen
Pszichosis	□ nem	□ igen

Nem megfeleően kontrollált infectio (szem-herpes, bacteriaemia) □ nem □ igen
Kezelt szívbetegség □ nem □ igen
Magasvérnyomás □ nem □ igen
Autoimmun kórkép □ nem □ igen
Diabetes □ nem □ igen
Véralvadási zavar □ nem □ igen
Neurológiai betegség □ nem □ igen
Várand ósság □ nem □ igen
Oralis fogamzásgátló szedése □ nem □ igen

ETIOLÓGIAI FAKTOROK
Diabetes □ nem □ igen
Sarcoidosis □ nem □ igen
Magasvérnyomás □ nem □ igen
Fertőzés: (dátum)
Bacterialis □ nem □ igen
Mumpsz □ nem □ igen
Herpes simplex □ nem □ igen
Lyme kór □ nem □ igen
Syphilis □ nem □ igen
HIV □ nem □ igen
Egyéb……..

FÜLÉSZETI ELŐZMÉNYEK:
Fülműtét a FP oldalán □Tympanoplastica Dátum
□ Neurinoma
Egyéb
Trauma a FP oldalán □Sebészi Dátum
□Sziklacsont törés
Egyéb
Fülészeti betegség □Acusticus neurinoma Mióta
□Otitis media chronica mesotympanica
Otitis media chronica cholesteatomatosa
Egyéb

RENDSZERES GYÓGYSZEREK: □ nem □ igen:

KEZELÉSI PROTOKOLL:
Steroid iv./p.o(2 mg/ kg/dosi 5 napig, majd 5 nap alatt lecsökkentve) □ igen □ nem □ más D:
Acyclovir (3x200-400 mg) po. Vagy iv Virolex (3x250 mg) □igen □nem □ más D:
Szemvédelem (műkönny, Oculotect, Vidisic, Corneregel (éjsz)) □ nem igen
Egyéb:

KLINIKAI VIZSGÁLAT:
Perifériás paresis (minden mimikai izom érintett) □ nem □ igen
Centrális paresis (az arc alsó része érintett) □ nem □ igen
Oldal □jobb □bal
FP kiterjedése □alsó felső
Bőrkiütés: □ nem igen
Mucosan eruptio □ nem □ igen
Parotis tapintási lelet □normális kóros
Microotoscopos lelet □normális kóros
Egyéb neurológiai deficit □ nem □ igen

3-7 NAP KÖZÖTTI VIZSGÁLATI EREDMÉNYEK

NET	jobb		bal	
Schirmer teszt	jobb		bal	
Tympanometria	jobb		bal	
Stapedius reflex	jobb	□igen	□csökkent	□nem
(**nincs stapedius-beszédaud**.)	bal	□igen	□csökkent	□nem
Audiogram	jobb		bal	
Zajban végzett beszédaudiometria:	jobb		bal	

Egyéb vizsgálatok

BERA:	jobb:	bal:
Otoneurológiai vizsgálat:	jobb:	bal:
Calroikus vestibularis ingerlés	jobb:	bal:

House-Brackmann : **Stennert:** **Yanagihara:** **Sunnybrook:**

Facogramm: homlok szem N szem erős nasolabialis redő szájzug

House-Brackmann skála:

I.	normális facialis funkció
II.	min.elmaradás a mozgásokban, előfordulhat enyhe synkinesis, de nyugalomban normál tónus *homlokráncolás*: kp.-jó ; *szemzárás* puhán is normális ; *szájzug*:kis aszimmetria
III.	észrevehető, de nem torzító asszimmetria, mérsékelt, nem torzító synkinesis, kontraktura, hemifacialis spasmus, nyugalomban normál tónus és szimmetria *homlokráncolás*: enyhe-kp. *szemzárás* erőltetve normális *szájzug*:max.erőlködés mellett kis elmaradás
IV.	Egyértelmű gyengeség vagy torzító asszimmetria, kifejezett synkinesis-kontraktúra vagy hemifacialis spasmus nyugalomban normál tónus és szimmetria *homlokráncolás*: nincs; *szemzárás*:inkomplett; *szájzug*: elmarad
V.	Alig észrevehető mozgás, nyugalomban is asszimetria *Homlokráncolás:* nincs; *szemzárás:* inkomplett; *Szájzug:* minimális mozgás
VI.	Nincs mozgás

Stennert-Limberg-Frentrup skála

Motilitás score (0-10)			Maradvány tünet score		
Nyugalmi			dysacusis	van	nincs
Szemrés differencia	< 3mm	> 3mm	ízérzés zavar	van	nincs
Entropium	nincs	van	*Synkinesis*		
Nasolabialis redő elsímult	nem	igen	homlok	igen	nem
Szájszeglet ptosisa	< 3mm	> 3mm	szem	igen	nem
Motilitás			nasolabialis redő	igen	nem
Homlokráncolás			szájszeglet	igen	nem
(redőképz.ill. szemöldökemelés >50%)	igen	nem	áll	igen	nem
lagophtalmus mérs.innerv	nincs	van	több mint 3 régió között		
max.innerv.	nincs	van	*Pseudospasmus*		
fogmutatás			mérsékelt	igen	nem
szemfog fent és lent látható	igen	nem	kifejezett	igen	nem
2..metsző fent teljes ssélességében	igen	nem	beteget zavarja	igen	nem
szájcsücsorítés			*Könnyelválasztás*	nem	igen
philtrum-szájszeglet megrövidülése	>50%	<50%	< 30%		
ellenoldalhoz képest			<30%, szemhéjzárás lehet 0%		
			Contractura	nem	igen
Krokodilkönny	nem	igen			
Paresis index:			**Maradványtünet index:**		

Sunnybrook skála:

Nyugalomban, ellenoldalhoz képest		Akaratlagos mozgások ellenoldalhoz képest izomtevékenység foka					Synkinesis		
Szem		nincs mozgás	kis mozgás	enyhe elmozdulás	majdnem teljes működés	normál működés	nincs	kis	súlyos
kp.									
Normál 0									
Keskenyebb 1									
Szélesebb 1	homlokráncolás	1	2	3	4	5	0	1	2 3
Szemműtét 1									
Nasolabialis redő									
Normál 0	puha szemzárás	1	2	3	4	5	0	1	2 3
Hiányzik 1									
Kevésbé kifejezett 1									
Kifejezettebb 1	nyitott szájas mosoly	1	2	3	4	5	0	1	2 3
Szájzug									
Normál 0	orrot felhúz(vicsorog)	1	2	3	4	5	0	1	2 3
Szájzug le 1									
Szájzug fel 1	csücsörít	1	2	3	4	5	0	1	2 3

Nyugalmi összpont x 5: akaratlagos mozgás összpont x 4: Synkinesis összpont:

Végeredmény (0-100) : akaratlagos- nyugalmi- synkinesis :

Yanagihara skála:

	Normál	Gyenge	Hiányzó
1 Nyugalomban	4	2	0
2 Homlokráncolás	4	2	0
3 Normál szemzárás	4	2	0
4 Erőltetett szemzárás	4	2	0
5 Kacsintás az érintett oldalon	4	2	0
6 Orr felhúzása	4	2	0
7 Arc felfúvása	4	2	0
8 Fütyülés	4	2	0
9 Széles mosoly	4	2	0
10 Alsó ajak lehúzása	4	2	0
Összpontszám (%)	40(100)	20(50	0(0)

15 NAPOS KONTROLL

House-Brackmann :	**Stennert:**		**Yanagihara:**	**Sunnybrook:**
Facogramm: homlok	szem N	szem erős	nasolabialis redő	szájzug

30 NAPOS KONTROLL

NET:	jobb	bal
Laboreredményekben eltérés	□ nem	□ igen:
Serológiai pozititás:	□ nem	□ igen
MRI	□ nem	□ igen:
CT	□ nem	□ igen:

House-Brackmann :	**Stennert:**		**Yanagihara:**	**Sunnybrook:**
Facogramm: homlok	szem N	szem erős	nasolabialis redő	szájzug

Egyéb:

4 HÓNAPOS KONTROLL

Objektív javulás:
Maradvány tünetek:

Synkinesis	□ nem	□ igen	□szem-száj	□száj-szem
Hemifacialis spasmus	□ nem	□ igen		
Kontraktúra	□ nem	□ igen		

House-Brackmann :	**Stennert:**		**Yanagihara:**	**Sunnybrook:**
Facogramm: homlok	szem N	szem erős	nasolabialis redő	szájzug

Szubjektív tünetek:

Ízérzés zavara	□ nem	□ igen:
Hyperacusis	□ nem	□ igen:
Szemszárazság	□ nem	□ igen:

Egyéb megjegyzés:

1 ÉVES KONTROLL

Objektív javulás:
Maradvány tünetek:

Synkinesis	□ nem	□ igen	□szem-száj	□száj-szem
Hemifacialis spasmus	□ nem	□ igen		
Kontraktúra	□ nem	□ igen		

House-Brackmann :	**Stennert:**		**Yanagihara:**	**Sunnybrook:**
Facogramm: homlok	szem N	szem erős	nasolabialis redő	szájzug

Szubjektív tünetek:

Ízérzés zavara	□ nem	□ igen:
Hyperacusis	□ nem	□ igen:
Szemszárazság	□ nem	□ igen:

Facialis rehabilitáció: □ ideganastomosis □myoplastica temporalis
□szemműtét (mi)

Egyéb megjegyzés:

8.2 Facial palsy protocol

TERÁPIA:

- Solu-Medrol 1,5-2 mg/kg 5 napig
  - 80 kg-ig 125 mg
  - 80-110 kg-ig 165 mg (125+40 mg), 4. és 5. napon 125 mg
  - 110 kg felett 250 mg, 4 és 5.napon 125 mg
- Gyomorvédelem: Panogastin este 40 mg vagy Quamatel 2x20 mg, 250 mg dózistól ill. pozitív gastritises-ulcusos anamnézis esetén Panogastin 2x40 mg v.Quamatel 2x40 mg
- Kálium R napi 1 tbl

A beteg bentfekvőként maradjon az első 1 vagy két éjszaka, utána hazajárhat.

Diabeteses beteg minden esetben végig maradjon bent.

VIZSGÁLATOK BENTFEKVÉS ALATT:

- Facialis skála felvétele (KG)
- Videó (KG-SZB)
- Audiológia (szerda13-15 h)
- Otoneurológia (spontán tünetek és calorikus ingerlés): szerda 13-15 h
- Schirmer teszt -1. vagy 2. napon
- Tympanometria és stapedius reflex – 1. vagy 2. napon
  - Stapedius rfx hiányában zajban végzett beszédaudiometria és magasfrekvenciákon végzett küszöbvizsgálat szükséges
- NET (4.-5.napon)

Egyéb vizsgálatok, kóros audiológiai lelet esetén:

- BERA (kedd vagy szerda 11-13h)
- OAE (kedd vagy szerda 11-13h)

OTTHONÁBAN:

- Steroid leépítése: Medrol 64-32-16-8-4 mg
- Panogastin este 40 mg 28 napig
- Kálium R 1x1 tbl 5 napig a steroiddal

Kontroll: 15.nap, 1 hó, 4 hó, 1 év

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10 KORSZERŰ DIAGNOSZTIKUS, PHARMACOLÓGIAI ES HELYREÁLLÍTÓ SEBÉSZI MÓDSZEREK AZ ARCIDEGBÉNULÁS KEZELÉSÉBEN

10.1 Bevezetés

A nervus facialis károsodása miatt a mimikai izmok az etiológiától, a folyamat lokalizációjától és súlyosságától függően részben, vagy összességükben, eltérő mértékben bénulhatnak. A motoros bénuláshoz, az ideg összetett működéséből következően, a vegetatív funkciók (könny- es nyálelválasztás, ízérzés) károsodása is társulhat. A klinikai képet később tovább árnyalhatják a maradványtünetek: a synkinesis, a hemispasmus, a contractura, a hyperacusis, a gustolacrimalis reflex, valamint a dysgeusia. Tudományos értekezésem az arcidegbénulás korszerű diagnosztikus, pharmacológia és helyreállító sebészi módszereivel és az ezen területen bevezetett új eljárásokról számol be.

10.2 Korszerű diagnosztikai és terápiás protokoll

Célom volt egy olyan egységes arcidegbénulás kérdőív létrehozása, amely gyorsan és egyszerűen alkalmazható a mindennapi hazai fül-orr-gégészeti gyakorlatban és mindenki számára elérhető. A kérdőív a következőeket foglalja magában: beteg adatok, anamnézis, etiológia, rizikófaktorok, fizikális vizsgálat, facialis tesztek eredménye, arcidegbénulás szubjektív és objektív osztályozása (facialis skálák), az alkalmazott terápia és a bénulás kimenetelének alakulása a rendszeres kontrollok alapján. A kérdőívvel egy időben egy korszerű terápiás protokoll is bevezetésre került, egységesítve az egyoldali akut arcidegbénulás kezelését.

10.3 Az arcidegbénulás osztályozása

Az arcidegbénulás összetett klinikai képének pontos leírása nehéz, bár fontos feladat, hiszen a bénulás súlyossága, a kezelésre adott válasz értékelése alapvető fontossággal bír a terápia meghatározásában. Az utóbbi évtizedekben számos, nemzetközileg is elfogadott osztályozás született, melyek legtöbbje azonban szubjektív, ugyanakkor a jelenleg használt objektív méréseken alapuló skálák alkalmazása bonyolult, időigényes, nehezen illeszthető be a mindennapi fül-orr-gégészeti gyakorlatba.

A tézisben beszámolok egy új, az arcmozgások digitális videó felvételének számítógépes feldolgozásán alapuló objektív értékelési módszerről, a Brian O’Reilly és munkatársai által

kidolgozott Glasgow Facial Palsy Score-ról és a vele szerzett első hazai tapasztalatainkról. A Szegedi Tudományegyetem Fül-Orr-Gégészeti és Fej-Nyaksebészeti Klinikáján 40 egymást követően diagnosztizált, arcidegbénulásban szenvedő betegen hasonlítottuk össze a módszert a korábbi szubjektív (House-Brackmann, Yanagihara és Sunnybrook skála) és objektív osztályozások (Stennert-Limberg-Frentrup) arcmozgásokat értékelő eredményeivel.

A GFPS eredményei jól korreláltak a többi hagyományos osztályozás eredményeivel. A legerősebb összefüggést a Yanagihara skálával találtunk. A vizsgálat gyors, kis eszközigényű, kivitelezéséhez elegendő egy egyszerű számítógép és egy digitális videókamera. A paresis súlyosságát régiónként ábrázoló görbe jól reprodukálható, a beteg dokumentációjában rögzíthető, első felmérésre, későbbi követésre, pre- illetve postoperatív bénulás dokumentálására egyaránt alkalmas. A módszer hiányossága, hogy a maradvány-tüneteket nem képes analizálni, ez korrigálható a Stennert-féle maradványtünet score-ral történő együttes használat esetén. A program a bénult oldal mozgását az épnek vélt ellenoldalihoz hasonlítja, így kétoldali paresis, illetve korábban lezajlott ellenoldali bénulás esetén nem alkalmazható.

10.4 Az arcidegbénulás sebészi rekonstrukciója

A sebészi reanimáció célja az arc szimmetriájának visszaállítása nem csak nyugalomban, hanem a spontán és akaratlagos mozgások során egyaránt, külön hangsúlyt fektetve a szemzárásra és mosolyra. Világszerte számos különböző technikával próbálják megvalósítani dinamikus rehabilitációt: a n.hypoglossussal, a n.accessoriussal vagy az ellenoldali facialissal képzett ideganastomosis, m. temporalis vagy m. masseter izomtranszpozíció és szabad izomlebeny átültetés.

1998-2005 között a párizsi Lariboisiere Egyetemi Klinikán 42 betegnél történt maradandó arcidegbénulás miatt facialis reanimáció. A betegek többségénél a bénulás koponyaalapi tumorok sebészi eltávolítást követően alakult ki. Egyéb kiváltó okok: középfül cholesteatoma sanatio, parotis tumor eltávolítás, traumás sziklacsonttörés illetve egy esetben kiváltó okot nem találtunk. Az alkalmazott facialis reanimációs technika end-to-end vagy end-to-side XII-VII ideganastomosis vagy temporalis izomtranszpozíció volt.

A tudományos értekezésben a fenti reanimációs technikák eredményét hasonlítjuk össze egy ötfős, fül-orr-gégészekből és plasztikai sebészekből álló szakértői valamint egy négyfős, művészi látásmóddal rendelkező nem orvosi bizottság segítségével. Kiegészítésként a betegek

kérdőívek segítségével saját maguk is értékelték az életminőség változását a műtét után. Az orvosokból álló bizottság négy ismert facialis skálát használt az arcidegfunkció felmérésére: House-Brackmann, Sunnybrook, Yanagihara és Freyss.

A szakértő és nem szakértő bizottság egyaránt azt találta, hogy mindkét hypoglosso-facialis anastomosis jobb eredményt nyújt, mint a temporalis izom leforgatása. A legjelentősebb különbség az arc alsó felének diszharmóniája izomtranszpozíció esetében, a feltűnő nasolabialis heg, az elkerülhetetlen felsőajak túlkorrekció és alsó ajak rehabilitáció hiánya miatt. Az ideganastomosisok esetén az end-to-end technika jobb izomtónust biztosít, de gyakoribb a synkinesis, mint az end-to-side technikánál. A páciensek a sebészi módszertől függetlenül minden esetben javulásról számoltak be.

10.5 Az arcidegbénulás szemészeti szövődményei és azok kezelése

Definitív arcidegbénulás esetén nagyon fontos a működési zavarok minimalizálása és elsősorban a szemzárás biztosítása. Klasszikusnak mondható sebészi eljárás a paralytikus lagophthalmus kezelésében hazánkban a lateralis tarsorrhaphia. Előnye, hogy egyszerűen kivitelezhető és a beteget anyagilag nem terheli meg. Hátránya, hogy sem funkcionális, sem esztétikai szempontból nem ad kielégítő eredményt. A külföldi tapasztalatok szerint kedvezőbb eredmények érhetők el a szemhéjzárást elősegítő aranysúly implantatióval és az alsó szemhéj ectropiumának korrekciójára szolgáló lateralis canthopexiával. Célom ezen eljárások hazai bemutatása és az első tapasztalatok értékelése.

2009. július és december között klinikánkon három betegnél végeztünk lateralis canthopexiát és aranysúly implantatiót. A arcidegbénulás mindhárom esetben maradandó volt, két esetben malignus parotis tumor eltávolítását, egy esetben recidiváló pleiomorph adenoma többszöri műtétét követően alakult ki. A két műtétet kombináltan alkalmazva szemhéj occlusioja már a műtétek után két héttel kitűnő volt.

Arcidegbénulás következményeként kilakuló lagophthalmus és ectropium esetén szemész szakorvossal együttműködve kell a konzervatív kezelést végezni és szükség esetén a megfelelő műtétet indikálni. Célszerű műtéti eszköztárunkat az egyszerű canthopexiával és aranysúly beültetéssel, illetve ezek kombinációjával bővíteni.

10.6 Új eredmények

Fenti eredményeinket és tapasztalatainkat összegezve elmondható, hogy hatalmas igény van egy egységes facialis protokollra, mely lehetővé teszi a különböző munkacsoportok eredményeinek összehasonlítását. Munkánkban törekedtünk többek között ennek az űrnek a betöltésére:

- Ismertetésre került egy összetett, de a mindennapi klinikai gyakorlatban könnyen alkalmazható kérdőívet, amely magában foglalja a következőket: beteg adatok, anamnézis, etiológiai és rizikó faktorok, fizikális vizsgálat, facialis tesztek, szubjektív és objektív osztályozások, az alkalmazott kezelés és a követés.

- Klinikánkon a fenti kérdőívvel párhuzamos bevezettük egy új terápiás protokollt, ezzel egységesítve az akut, egyoldali arcidegbénulás kezelését.

- Hazánkban és Európában először bevezetésre került napi klinikai rutin részeként, egy új, egyszerű, objektív és kvantitatív osztályozás (Glasgow Facial Palsy Score) a facialis paresis felmérésében: A módszer eredményeit összehasonlítottuk a nemzetközi gyakorlatban használt egyéb szubjektív és objektív skála eredményeivel.

- Külföldön végzett klinikai gyakorlatom alapján beszámoltam a három facialis reanimációs módszerről és azok eredményeiről.

- A magyarországi fül-orr-gégészeti gyakorlatban elsőként alkalmaztunk egy külföldön elismert, egyszerű sebészi módszert a definitív facialis paresis esetében kialakuló lagophthalmus és ectropion kezelésében.

10.7 Jövő

A jövőben a továbbiakat szeretném megvalósítani:

- Kidolgozni és a nemzetközi gyakorlatba is bevezetni egy új arcidegbénulást osztályozó módszert, amely segítségével objektíven kiértékelhetővé válnak a facialis reanimáció eredményei is.

- További szemhéjzáró műtéteket kivitelezni és megfelelő esetszám esetén statisztikailag is kiértékelni eredményeinket.

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