European Annals of Otorhinolaryngology, Head and Neck diseases xxx (2016) xxx–xxx

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Original article

Peripheral facial palsy: Speech, communication and oral motor function

T. Movérare[a,b], A. Lohmander[a,b], M. Hultcrantz[c,d], L. Sjögreen[e,*]

[a] *Karolinska Institutet, Department of Clinical Science, Intervention and Technology, Division of Speech and Language Pathology, 141 86 Stockholm, Sweden*
[b] *Karolinska University Hospital, Department of Speech and Language Pathology, 141 86 Stockholm, Sweden*
[c] *Karolinska Institutet, Department of Clinical Science, Intervention and Technology, Division of Ear, Nose and Throat Diseases, 171 76 Stockholm, Sweden*
[d] *Karolinska University Hospital, Department of Otorhinolaryngology and Head and Neck Surgery, 171 76 Stockholm, Sweden*
[e] *University of Gothenburg, Institute of Neuroscience and Physiology, Division of Speech and Language Pathology, Mun-H-Center Orofacial Resource Centre for Rare Diseases, Box 7163, 402 33 Gothenburg, Sweden*

ARTICLE INFO

Keywords:
Facial paralysis
Articulation disorder
Speech intelligibility
Communication
Deglutition disorder
Saliva control

ABSTRACT

Objectives: The aim of the present study was to examine the effect of acquired unilateral peripheral facial palsy on speech, communication and oral functions and to study the relationship between the degree of facial palsy and articulation, saliva control, eating ability and lip force.
Materials and methods: In this descriptive study, 27 patients (15 men and 12 women, mean age 48 years) with unilateral peripheral facial palsy were included if they were graded under 70 on the Sunnybrook Facial Grading System. The assessment was carried out in connection with customary visits to the ENT Clinic and comprised lip force, articulation and intelligibility, together with perceived ability to communicate and ability to eat and control saliva conducted through self-response questionnaires.
Results: The patients with unilateral facial palsy had significantly lower lip force, poorer articulation and ability to eat and control saliva compared with reference data in healthy populations. The degree of facial palsy correlated significantly with lip force but not with articulation, intelligibility, perceived communication ability or reported ability to eat and control saliva.
Conclusion: Acquired peripheral facial palsy may affect communication and the ability to eat and control saliva. Physicians should be aware that there is no direct correlation between the degree of facial palsy and the possible effect on communication, eating ability and saliva control. Physicians are therefore recommended to ask specific questions relating to problems with these functions during customary medical visits and offer possible intervention by a speech-language pathologist or a physiotherapist.

1. Introduction

Peripheral facial palsy is characterised by unilateral weakness or paralysis of muscles of the forehead, eye and mouth. This may cause asymmetry in the face and difficulty in articulation, eating, drinking and saliva control [1]. The aetiology of peripheral facial palsy can be infection, trauma, vascular lesions and tumours, among others [2]. Idiopathic facial palsy, or Bell's palsy, is the most common cause of peripheral facial palsy, with an average annual incidence of 30 per 100,000 individuals [3]. Of patients with Bell's palsy, 70% recover within six months. The remaining 30% have varying degrees of sequelae, with residual paresis, contracture and synkinesis. Four percent have a persistent severe degree of sequelae [4].

The facial nerve contributes to the oropharyngeal phase of swallowing via motor innervation of the orbicularis oris, zygomaticus, buccinator, digastricus posterior and stylohyoid muscles. The facial nerve also provides innervation to salivary glands and taste to the anterior two-thirds of the tongue [3]. Peripheral facial palsy can affect swallowing ability, with difficulty mostly in the oral phase, and compensatory strategies are often used to facilitate eating and drinking [5–7].

Lip force and lip mobility are important for the control of saliva and for functioning speech, or, more specifically, for the articulation of labial consonants [8]. As the primary goal during a conversation is comprehension, it is of great interest to investigate how speech impairment affects the intelligibility of the speaker [9]. Intelligibility can be a measure of communicative efficiency, that is the extent to which a listener perceives what the speaker intends to say.

* Corresponding author. Mun-H-Center Odontologen, Mun-H-Center Orofacial Resource Centre for Rare Diseases, Public Dental Service, Västra Götaland Region, Box 7163, 402 33 Gothenburg, Sweden. Tel.: +46 10 441 7989.
E-mail address: lotta.sjogreen@vgregion.se (L. Sjögreen).

http://dx.doi.org/10.1016/j.anorl.2015.12.002
1879-7296/

Intelligibility tests are an appropriate way of quantifying speech impairments and impact on communicative function. Furthermore, the degree of speech difficulty does not necessarily correlate with perceived communication ability. Communication is also affected by personal factors, the situation and the person to whom one is talking [10]. Facial expression is also known to be important for displaying emotions effectively and enhancing communication [11].

Lip mobility and lip force are likely to be affected in individuals with acquired peripheral unilateral facial palsy, but the degree to which lip impairment might affect speech intelligibility, communication and the ability to eat and to control saliva in this group of patients is not clear from the literature. The aim of the present study was therefore to examine the effect of acquired unilateral peripheral facial palsy on speech, communication and oral functions and to study the relationship between the degree of facial palsy and articulation, saliva control, eating ability and lip force.

2. Materials and methods

2.1. Participants

A series of 27 patients (15 men and 12 women, mean age 48 years, range 17–82 years) with unilateral peripheral facial palsy was included in this descriptive study. All patients had scheduled appointments at the ear, nose and throat clinic at Karolinska University Hospital between May 2013 and December 2013. Patients were included if they were graded under 70 using the Sunnybrook Facial Grading System (SFGS) [12] by the speech-language pathologist and excluded if they had other neurological injuries or diseases affecting oral motor skills and speech and/or language skills. Of the patients, 22 were diagnosed with Bell's palsy, four with Herpes simplex and one patient had facial palsy after surgery. Seven patients were bilingual, with Swedish as their second language. Informed consent was obtained from all patients.

2.2. Procedure

All assessments were performed by the same speech-language pathologist in connection with customary medical visits to the clinic.

2.2.1. Facial mobility

Facial paralysis was graded with the SFGS independently by a physician (16 different) and by the speech-language pathologist. The grading was made by the physician during the customary medical visit and was then repeated by the speech-language pathologist the same day or within one week.

The SFGS is a regionally weighted system that includes evaluation of resting symmetry, degree of voluntary movement and synkinesis to produce a composite score from 0 to 100, where 0 is complete paralysis and 100 indicates normal function [12,13].

2.2.2. Lip force measurement

Maximum lip force (Newton) was evaluated with a digital force meter (Alluris FMI Force Gauge FMI-220C2) connected to an oral screen (Ulmer model large). The patient placed the oral screen inside his/her lips, in front of the teeth, and was instructed to keep the oral screen inside the lips while the examiner pulled the force meter with increasing force until the oral screen was dropped. The best of three obtained values was saved [8].

2.2.3. Speech assessments

Speech was evaluated on the basis of articulation and intelligibility. The tests were audio recorded using an h4 Handy recorder connected to a microphone (RØDE NT4 stereo) placed approximately 50 cm in front of the mouth. A complete articulation test was performed using SVANTE (Swedish articulation and nasality test) [14]. The patient read aloud a list of words with target sounds in different positions. The analysis was conducted through phonetic transcription. Two trained listeners independently transcribed the pronunciation of the target consonants. The percentage of consonants correctly articulated (PCC) was calculated, together with an error analysis. Intelligibility was assessed with SWINT (Swedish intelligibility test) [9]. The patient read aloud a list of 66 words randomly generated by a computer. Untrained listeners performed the analysis through word identification. They were asked to choose the word they thought they heard from a multiple-choice list where the target words were listed along with associated alternative words. Five different lists with minor changes were used. The percentage of words correctly understood (PWC) was calculated, together with an error analysis. The audio recordings were independently assessed by 10 untrained listeners; the listeners only heard the five lists once, or at least three months passed before they heard the same list a second time.

2.2.4. Questionnaire about communication

A questionnaire about perceived communication ability [10] was used. It contained 30 statements graded on a four-point scale: not true at all, sometimes true, true most of the time, exactly right. It examined patients' experiences in three areas: (a) function, (b) activity and participation and (c) personal and environmental factors. The score for the entire questionnaire ranges from 0 to 90, where 0 indicates no difficulties.

2.2.5. Questionnaire about eating, swallowing and saliva control

Patients answered whether they had any problem with eating and drinking on a four-point scale: no, not at all; no, not really; yes, to some extent; and yes, very much. They were also asked to specify any difficulties with eating and drinking by answering yes/no questions. Individuals who had problems with saliva control were asked to indicate whether the difficulties with saliva control were mild, moderate or severe [15].

2.3. Reliability

Inter-rater reliability was investigated with an intraclass correlation coefficient (ICC), absolute agreement. The ICC was 0.917 for the SFGS, 0.834 for the SVANTE articulation test and 0.871 for the SWINT intelligibility test. The transcription of SVANTE made by the listener with the highest intra-rater reliability (ICC 0.974) was used in the correlation analysis. All assessments proved to have good inter-rater reliability, as an ICC value higher than 0.8 is regarded as good reliability [16].

2.4. Statistical analysis

Data were analysed with IBM SPSS Statistics, version 21. Descriptives were calculated for all measures and compared with published reference data (means and standard deviations). The differences between the group with facial palsy and the reference data were tested with Student's *t*-test. However, according to the Kolmogorov-Smirnov test, the data in this study did not have normal distribution and medians and range values were therefore also calculated and the correlations between variables were tested with Spearman's rank correlation coefficient. The SFGS grading performed by the speech-language pathologist was used for the correlation analysis. All analyses related to speech and communication were also conducted with bilingual patients excluded, because they may have reduced articulation and intelligibility for reasons other than facial paralysis.

Please cite this article in press as: Movérare T, et al. Peripheral facial palsy: Speech, communication and oral motor function. European Annals of Otorhinolaryngology, Head and Neck diseases (2016), http://dx.doi.org/10.1016/j.anorl.2015.12.002