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# Can objective measurements of the nasal form and function represent the clinical picture in unilateral cleft lip and palate?



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## KEYWORDS

Self-assessment;  
Nasal function;  
Cleft lip and palate;  
Acoustic rhinometry;  
Rhinomanometry;  
Adults

**Summary** *Background:* The present study aimed to evaluate the potential correlations between objective measurements of nasal function and self-assessed nasal symptoms or clinical findings at nasal examination among adults treated for unilateral cleft lip and palate (UCLP), respectively.

*Methods:* All UCLP patients born between 1960 and 1987 ( $n = 109$ ) treated at a tertiary referring center were invited. Participation rate was 76% ( $n = 83$ ) at a mean of 37 years after the initial surgery. All participants completed the same study protocol including acoustic rhinometry (AR), rhinomanometry (RM), anterior rhinoscopy, and questionnaires regarding self-experienced nasal symptoms.

*Results:* A reduced volume of the anterior nasal cavity on the operated side (measured by AR) correlated to an expressed wish by the patient to change the function of the nose. A similar correlation was seen for the minimal cross-sectional area of anterior nasal cavity on the operated side. Furthermore, correlations were found between smaller volume and area of nasal cavity and a greater frequency of nasal obstruction. No further correlations were found.

*Conclusion:* Objective measurements partly correlate to the clinical picture among adults treated for UCLP. However, these need to be combined with findings at clinical examination and patient self-assessment to represent the complete clinical picture.

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## Introduction

Cleft lip and palate (CLP) is associated with inadequate function, shape and appearance of the nose. Functional impairments of the nose have been reported in 70% of adults with CLP<sup>1</sup> affecting patients personal and professional life, physical activity, wellbeing and general quality of life negatively.<sup>2</sup> It is well known that the nasal patency is usually affected in these patients.<sup>2</sup> However, there are great differences in patient reported impact on quality of life (QoL).<sup>3</sup> Patients treated for unilateral cleft lip and palate (UCLP) report higher occurrence of symptoms related to the function of the nose compared to people without cleft.<sup>2</sup>

Defining objective and measurable end-points is important in all health care, including cleft care. These objective end-points are essential for the evaluation of care and are an important tool when comparing different treatment protocols, impact of changed treatment strategies, and the course of disease at an individual level. As such, it is important to find objective measurements in cleft care. In earlier studies, acoustic rhinometry (AR) and rhinomanometry (RM) have been used as objective end-points of cleft care. Analyses of these methods among UCLP patients have shown that end-points such as cross-sectional area, volume, and airflow resistance are more affected in patients than in controls.<sup>4,5</sup> Reduced size of the nasal airway can also be observed in Complete Unilateral CLP patients on a computer tomography (CT).<sup>6</sup> However, to consider these measurements as relevant clinical tools for assessment of cleft care, the correlation with self-assessed symptoms and clinical findings needs to be defined. By identifying objective measurements that correspond to the clinical picture, evaluation of the treatment over time and between different sites can be made possible.

The aim of the present study was to identify objective measurements of nasal function that correlate to subjective self-assessment of nasal function and/or to findings at nasal examination in patients treated for UCLP.

## Material and methods

### Patients

All subjects treated for complete UCLP in the uptake area of Uppsala University Hospital (UU), Uppsala, Sweden, and born between 1960 and 1987 were considered for the study. Uppsala University Hospital offers tertiary health care services to around 1.5 million people, with no alternative facilities offering complete treatment of patients with CLP. This study did not include patients with incomplete lip or palate cleft or with Simonart's band. Out of 128 patients considered for this study, 19 were excluded for the following reasons: serious illness (e.g., major stroke) ( $n = 5$ ); not existing within the national population registry ( $n = 3$ ); death ( $n = 6$ ); and living abroad ( $n = 5$ ). A total of 109 patients were subsequently invited to participate through an information letter and a follow-up telephone call with further information regarding the study. Seventy-six percent of the invited patients participated ( $n = 83$ ). Partial salary loss and transportation expenses were

compensated to minimize dropouts for financial reasons because many patients had a long travel distance ( $>100$  km). The mean follow-up time was 37 years from the initial surgery. The nonparticipating and participating group did not diverge with regard to age and gender distribution (Table 1). The reasons given for not participating were lack of time ( $n = 7$ ), long travel distance ( $n = 11$ ), unwilling to be reminded of the treatment period ( $n = 3$ ), and no reason provided ( $n = 5$ ).

Patients included in the present study were treated according to surgical protocol previously described by Mani and et al.<sup>4</sup> The palate was repaired following a one- or a two-stage closure. Patients born between 1960 and 1975 were treated with the one-stage technique,<sup>7</sup> whereas those born between 1976 and 1987 were treated with the two-stage technique.<sup>8,9</sup> In addition, lip closure was performed according to Skoog.<sup>7</sup>

### Self-assessment of nasal function

For the evaluation of satisfaction with nasal function and treatment, the cleft evaluation profile instrument with modified questions as developed by the Royal Collage of Surgeons Cleft Lip and Palate Audit was used.<sup>10,11</sup> A separate questionnaire assessing nasal symptoms, current medication, comorbidities, previous and current airway disease, and operations or nasal trauma was included.

All questions were answered according to visual analogue scale (VAS), with markings along a line ranging from 0 to 10, where 10 expressed higher level of symptoms/more satisfaction and 0 indicated no symptoms/low satisfaction, or a categorical scale with multiple choices. In the present study, questions answered on the VAS were used to estimate and grade the level of nasal obstruction and the desire to change the function of the nose. Examples of questions used were, "To what level is your nose obstructed?" "To what extent would you like to improve the function of the nose?" and "Are you troubled by nasal obstruction?"

All subjects were invited to the clinic at a specifically arranged visit for the study at the Department of Otorhinolaryngology, UU. Nasal patency and function were analyzed, and results have been previously described.<sup>4</sup> A summary of the functional test and clinical examinations is presented below.

**Table 1** Number (n), age, and gender of patients with UCLP.

| Patients                                      |                  |
|---|------------------|
| Total number of patients                      | 128              |
| Excluded                                      | -19              |
| Invited to participate                        | 109              |
| Declined participation                        | 23               |
| Participants with incomplete examination data | 3                |
| Participating individuals                     | 83               |
| Age (range)                                   | 34 years (20–47) |
| Male  | 46 (55%)         |
| Female  | 37 (45%)         |

UCLP = Unilateral cleft lip and palate.

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