Oral strength in subjects with unilateral cleft lip and palate

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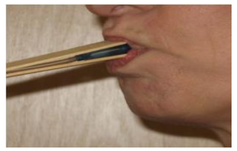
Introduction

Facial appearance and speech outcome may affect psychosocial functioning in girls and boys. Several studies reported dissatisfaction with facial appearance and more specifically the lip and mouth profile in children with cleft lip and palate (CLP). An appropriate lip and tongue function is essential for facial aesthetics (e.g., lip competence, interdental tongue behavior), speech production and non-verbal functions like chewing, swallowing and facial emotional readability. Few authors assessed oral strength in children with cleft lip and palate. Therefore, the purpose of this controlled study was to measure the tongue and lip strength and endurance in boys and girls with CLP.

Methods and materials

	Patients	Control
N	25	25
Age	mean: 10.6y 6.0-17.9y	mean: 10.7y 6.7-18.2y
Gender	17 ♂, 8 ♀	17 ♂, 8 ♀
Lip closure modified Millard	mean: 5.5m 3.0-6,1m	N.A.
Palatal closure Wardill-Kilner	mean: 12.5m 11,9-20,1m	N.A.
Bone grafting	mean: 8.03y 7.09-11.6y	N.A.

- Orofacial myofunctional behavior
  Lembrechts et al. (1999); Van Lierde et al. (2012)
  - Lip function
  - Tongue function
- Instrumental assessment
  - IOPI *IOPI Medical LLC, 2005*
    * Lip strength
    * Tongue elevation strength
    * Tongue endurance



Results

Oromyofunctional behavior	Patients		Controls		p
	Normal	Affected	Normal	Affected	
Lip position at rest	**64% 16/25**	**36% 9/25**	**100% 25/25**	**0% 0/25**	**0.001***
Lip closure	84% 21/25	16% 4/25	100% 25/25	0% 0/25	0.055
Lip protrusion	**56% 14/25**	**44% 11/25**	**100% 25/25**	**0% 0/25**	**<0.001***
Lip strength	96% 24/24	4% 1/25	100% 25/25	0% 0/25	0.500
Dispersion of corners of the mouth	96% 24/25	4% 1/25	100% 25/25	0% 0/25	0.500
Tongue protrusion	88% 22/25	12% 3/25	100% 25/25	0% 0/25	0.117
Tongue clicking	**64% 16/25**	**36% 9/25**	**96% 24/25**	**4% 1/25**	**0.010***
Tongue lifting against lower lip	92% 23/25	8% 2/25	100% 25/25	0% 0/25	0.245

*Fisher's Exact test, p≤0.5

Instrumental assessment: IOPI	Patients	Controls	p*	Reference data *Clark & Solomon, 2012*
Lip strength (kPa)	21.6 (5.5)	20.7 (5.5)	0.572	NA
Tongue elevation strength (kPa)	37.2 (15.3)	43.0 (14.8)	0.189	49.8 (range 42-58) 10.0-10.11y
Tongue endurance (s)	3.7 (2.3)	3.9 (3.7)	0.816	NA

*Student t-test, p ≤0.05

Discussion and conclusion

Based on the orofacial myofunctional behavior assessment, lip incompetence and decreased tongue clicking was significantly more observed in children with CLP compared to a control group. However, these distortions were not related to a decreased lip or tongue strength as measured with the IOPI. In conclusion, the results of this controlled study demonstrated normal lip and tongue functions in young subjects with unilateral CLP as measured with the IOPI. The surgical correction of the pathological lip anatomy leads to a normal lip function in these subjects with a unilateral CLP. The ENT specialists and speech pathologists must be aware of this aspect.

References

- Clark, H, & Solomon, N (2012) Age and sex differences in orofacial strength, *Dysphagia*, 27(1), 2–9.
- Lembrechts D, Verschueren D, Heulens H, Valkenburg HA, Feenstra L. (1999) Effect of a logopaedic instruction program after adenoidectomy on open mouth posture: a single-blind study. *Folia Phoniatrica et Logopaedica*, 1(3), 117-23.
- Van Lierde K, Browaeys H, Corthals P, Mussche P, Van Kerkhoven E, De Bruyn H. (2012) Comparison of speech intelligibility, articulation and oromyofunctional behaviour in subjects with single-tooth implants, fixed implant prosthetics or conventional removable prostheses. *Journal of Oral Rehabilitation*, 39(4), 285-93.