

## Facial movements during verbal and not verbal activities: an optoelectronic 3D study

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Functional impairments of facial movements alter the quality of life, and their quantitative analysis is a key step in the description and grading of facial function and dysfunction. In this investigation we assessed the symmetry of lip movements in verbal and non verbal movements in healthy subjects.

Fifteen healthy young adults (aged 24.7±4.6 y) were analysed using a 3D motion analyzer (SMART-E, BTS, Italy). All subjects had a clinically normal facial function. For each subject, 11 soft tissue landmarks were identified by a set of 5-mm round reflective markers: n, nasion; ft, right and left frontotemporale; ng, right and left naso-genian; cph, right and left crista philtri; ch, right and left cheilion; li, right and left lower lip midpoints. Each subject performed five standardized, maximum labial animations from rest: open mouth smile (OS); closed mouth smile (CS); spontaneous smile (SS); lip pursing (LP); vowels pronunciation. Ten repetitions of each expression were recorded without modifications of the marker positions.

The total 3D mobility of right and left sides (unit: mm) was computed during smile animations (OS: 42±11.1 vs 44.1±10.8; CS: 30.5±11.4 vs 33.1±12.3; SS: 38.8±13.7 vs 39.5±12.7), lip purse (35.1±5.8 vs 34.9±7.1) and vowels pronunciation (a: 33.8±9.5 vs 33.4±11.2; e: 21.4±8.1 vs 21±9.4; i: 15.4±5.2 vs 15.4±5.7; o: 23.2±7.6 vs 22.2±6.6; u: 20.8±6.5 vs 18.8±6.2). The movements were symmetric (no significant differences were found, Student's t-paired test, p>0.05). Additionally, the asymmetry indices of labial landmark displacement [1] were not significantly different from 0 in both not-verbal (OS: 2.9%; CS: 4.3%; SS: 3.5%; LP: 0.7%) and verbal (a: 1.2%; e: 1.7%; i: 0.5%; o: 1.7%; u: 5.2%) activities.

In conclusion, in healthy young adults standardized labial movements were performed with similar mobility between right and left sides. Data will be used for the quantitative assessment of the impairments of patients with facial lesions.

### References

- [1] Sforza et al. (2009) A three-dimensional study of facial mimicry in healthy young adults. *J Cranio-maxillofac Surg* 38:409-415.

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