

## Factors Influencing The Early Visual Processing of Cleft Faces.

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**INTRODUCTION:** Attractive people elicit more positive first impressions.<sup>1</sup> Conversely, facial deformity diminishes quality of life even after surgical reconstruction of a cleft deformity.<sup>2,3</sup> Symmetry has been shown to be one significant factor influencing aesthetic judgments of the face.<sup>4,5</sup>

### Purpose:

To investigate the impact of cleft laterality and attractiveness on the early visual processing of faces with cleft lip. Primary aim: to study the visual markers leading to differential perception of patients with cleft lip. Secondary aim: to evaluate the influence of observer personal history of facial deformity on visual processing of the cleft-affected face. By delineating the focus of visual impression formation, surgeons and their patients may pinpoint the most salient facial features so as to better direct prioritization of surgical reconstruction.

**MATERIALS AND METHODS:** 59 experimental and 59 control facial images were obtained from the senior author's practice. Experimental images included 15 individuals with repaired cleft lip (6R, 5B, 4L) and 45 with a variety of other facial diagnoses.

240 subjects rated the images for attractiveness.

Twenty standardized lookzone regions were mapped onto each facial image.

A separate group of 170 subjects observed the images while an infrared eye-tracking camera continuously recorded their eye movements.

Personal history of observer facial deformity was solicited.

Factorial ANOVA analysis was performed to determine significance of gaze patterns and attractiveness between groups.

### Outcomes Measured:

Image attractiveness was rated on a 1-7 Likert scale.

Total number of eye fixations within different lookzone regions was recorded.

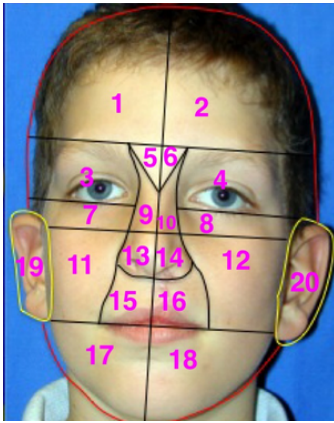
**RESULTS:** The following observations were statistically significant at  $p < 0.01$  level:

- (i) Subjects preferentially fixated on the periorbital regions of all faces, but paid greater attention to the perioral region of cleft-affected versus control faces.
- (ii) Above phenomenon tracked closely to laterality of cleft.
- (iii) Subjects fixated more on unilateral than on bilateral cleft lip.
- (iv) More attractive the overall cleft image rating, the less time the perioral region was fixated upon.
- (v) Observers with personal history of facial deformity fixated longer on the perioral region of cleft faces.

**CONCLUSION:** Observers are drawn to the abnormal region of cleft faces. Unilateral clefts - and cleft faces that are considered less attractive overall - induce relatively greater fixation within the perioral region. Personal history of facial deformity may heighten detection of, and/or diversion towards, the cleft deformity.

## REFERENCES:

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Lookzone Regions: R/L:

1/2: forehead

3/4: periorbital

5/6: glabellar

7/8: infraorbital

9/10: lateral nasal sidewall

11/12: mid-cheek

13/14: nasal tip, nares, and columella

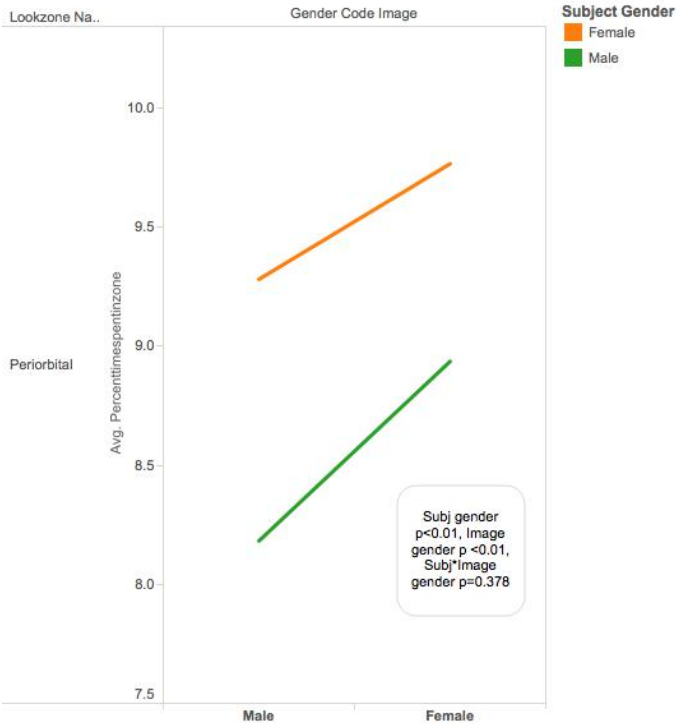
15/16: upper lip

17/18: lower lip, chin, mandible

19/20: ears

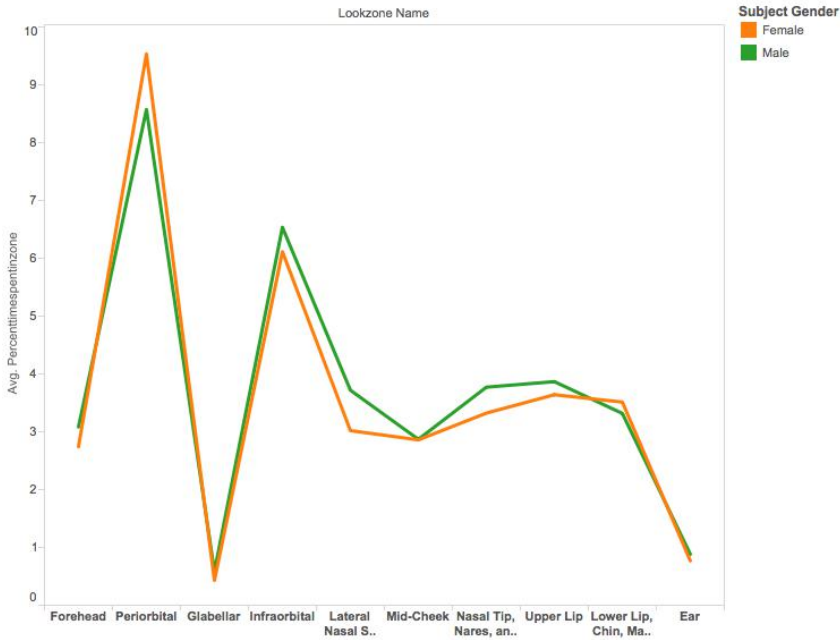
(Note the lookzones 1 and 2 are bordered by the eyebrow, 3 and 4 borders by the lower eye, 7 and 8 by the eyebags, 15 and 16 by the midlip opening, 11 and 12 by the nasolabial fold, and 17 and 18 by the chin)

Gender Image vs Subject Periorbital TimeinZone



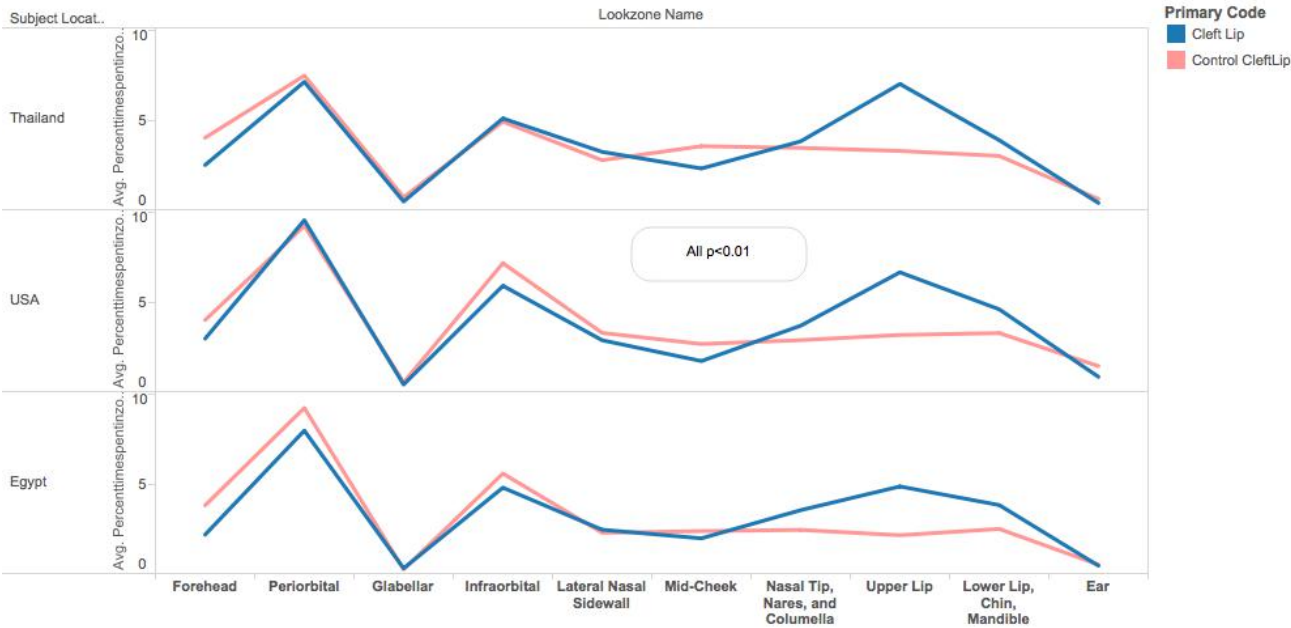
The trend of average of Percentimespentinzone for Gender Code Image broken down by Lookzone Name. Color shows details about Subject Gender. The view is filtered on Subject Gender and Lookzone Name. The Subject Gender filter keeps Female and Male. The Lookzone Name filter keeps Periorbital.

Gender Time In Zone



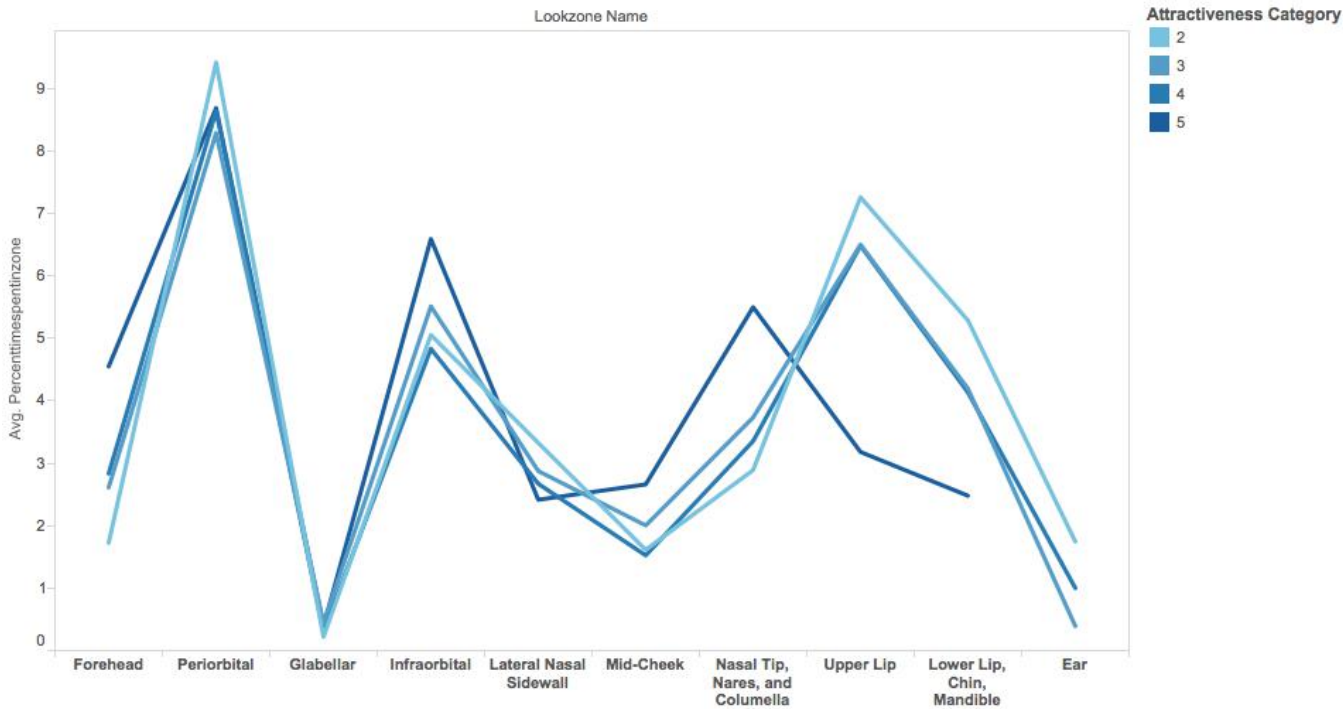
The trend of average of Percentimespentinzone for Lookzone Name. Color shows details about Subject Gender. The view is filtered on Subject Gender, which keeps Female and Male.

Cleft Lip vs Control, Location, Time in Zone



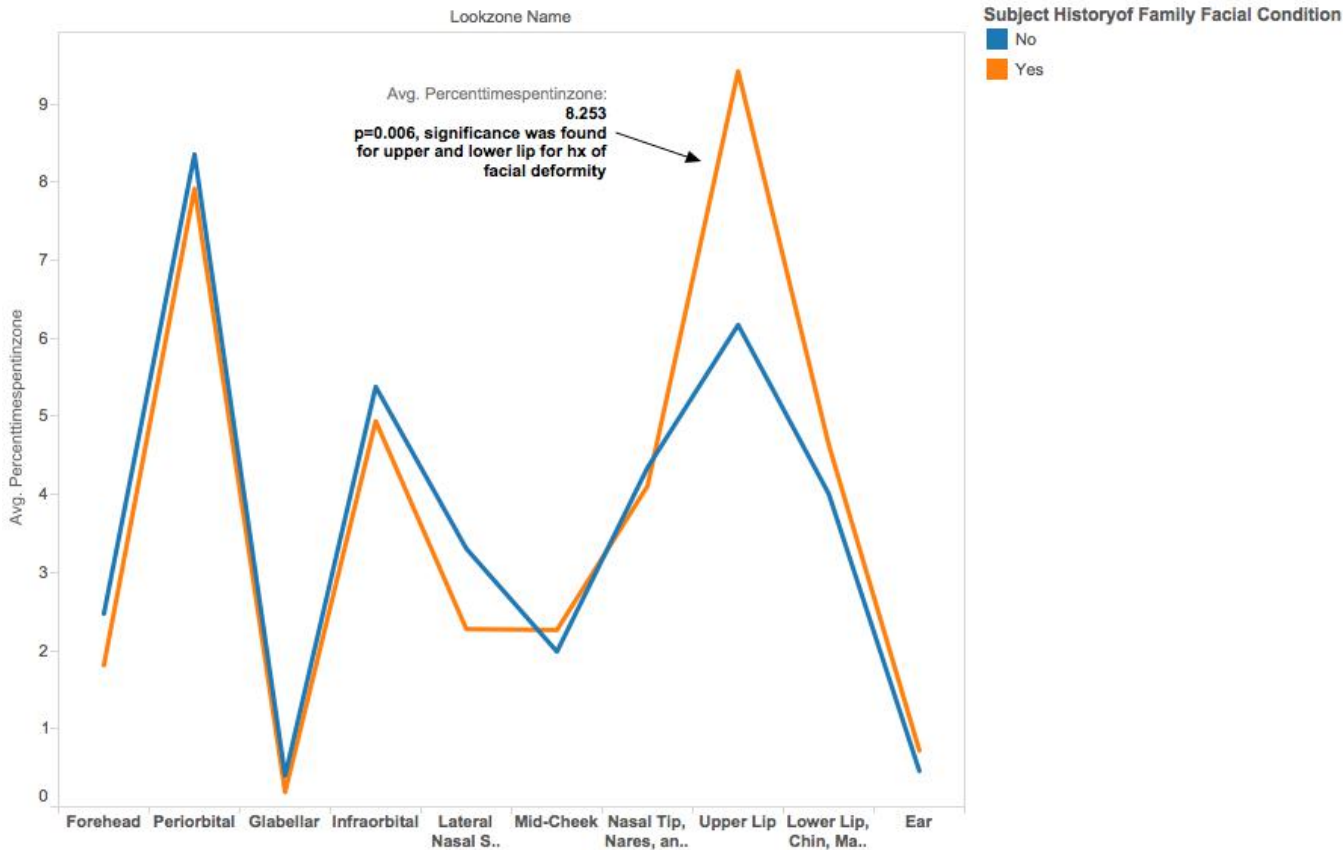
The trend of average of Percenttime spent in zone for Lookzone Name broken down by Subject Location. Color shows details about Primary Code. The data is filtered on SS#, which keeps 1, 2 and 3. The view is filtered on Primary Code and Subject Location. The Primary Code filter keeps Cleft Lip and Control Cleft Lip. The Subject Location filter keeps Thailand, USA and Egypt.

CL Time in Zone Lookzone region



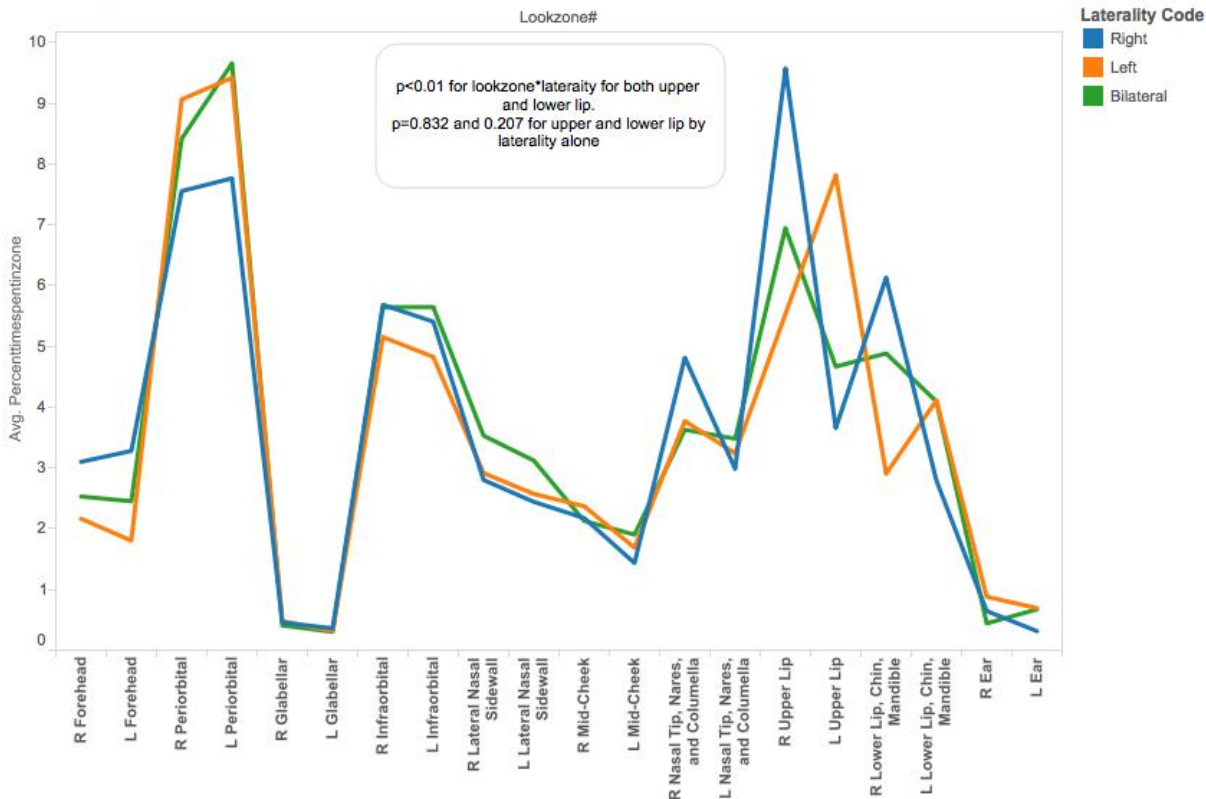
The trend of average of Percenttime spent in zone for Lookzone Name. Color shows details about Attractiveness Category. The data is filtered on Primary Code, SS# and Subject Location. The Primary Code filter keeps Cleft Lip. The SS# filter keeps 1, 2 and 3. The Subject Location filter keeps Thailand, USA and Egypt.

Subj Hx Facial condition



The trend of average of Percentimespentinzone for Lookzone Name. Color shows details about Subject History of Family Facial Condition. The data is filtered on Primary Code, which keeps Cleft Lip. The view is filtered on Subject History of Family Facial Condition, which keeps No and Yes.

Laterality Fixation Lookzone



The trend of average of Percentimespentinzone for Lookzone#. Color shows details about Laterality Code. The data is filtered on Primary Code, SS# and Subject Location. The Primary Code filter keeps Cleft Lip. The SS# filter keeps 1, 2 and 3. The Subject Location filter keeps Thailand, USA and Egypt.