how faces are reflexively interpreted by others. This knowledge may also help focus surgical reconstructive priorities.

**METHODS:** 59 experimental and 59 control facial images were obtained from the senior author’s practice. Experimental images included the following diagnoses (15 cleft lip, 15 facial aging, 12 ear deformity, 7 facial lesion, 6 HIV lipoatrophy, 3 facial asymmetry, 2 nasal deformity). Twenty standardized lookzone regions were mapped onto each facial image. 170 adult subject observers were recruited in two locations (107 in USA and 63 in Thailand) and asked to observe a slideshow of images while a digital infrared eye-tracking camera continuously recorded their eye movements.

**OUTCOMES MEASURED:** The total number of eye fixations within the different lookzone regions was recorded. Factorial ANOVA analysis was performed to determine significance of gaze pattern differences between groups.

**RESULTS:** The following observations were statistically significant at p<0.01 level. Compared to when looking at age-matched control images:

(i) subjects in both Thailand and the USA preferentially fixated on the periorbital regions of the face
(ii) Thai subjects fixated relatively more on lower facial regions while American subjects fixated preferentially on upper facial regions
(iii) Both Thai and the USA subjects paid significantly greater attention to the regions of the affected upper and lower lip of images with cleft deformity, and the auricular region of images with ear deformity.
(iv) Within this sample, statistically significant differences in gaze pattern were not detected for the other facial deformities considered.

**CONCLUSIONS:** Western and Southeast Asian populations preferentially inspect the periorbital region during early visual processing of a face, and are similarly drawn to regions of difference when observing cleft lip or ear deformity. Southeast Asians focus greater attention on the lower facial region while Westerners focus more on the upper/periorbital facial region.

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**The Influence of Age and Facial Image Attractiveness on Pupillary Response**

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**INTRODUCTION:** Facial difference affects quality of life, and ample evidence suggests that social bias and stigmatization often persist even after the provision of high-quality facial reconstruction. Because emotional arousal is reflected in the magnitude of pupillary dilatation, we have investigated the influence of both facial image attractiveness and observer age on observer pupillary response. We have also secondarily examined the related effect of facial age (of image, including a subset of images of patients with cleft lip) and cultural background (observer) on attractiveness rating.

**PURPOSE:** Our aim is to study the visual markers that lead to differential perception of patients with congenital or acquired facial difference by examining the early stages of visual processing. Here we examine the influence of age and attractiveness on autonomic reaction as manifested by pupillary response. This information may better inform surgeons’ conversations with patients by improving their understanding of how faces are reflexively interpreted by others.

**METHODS:** 118 experimental and 79 control facial images were obtained from the senior author’s practice. Experimental images included: 29 cleft lip, 22 facial aging, 18 facial lesion, 16 ear deformity, 14 HIV lipodystrophy, 11 nasal deformity, 6 dermatochalasis. 481 subjects rated the images for attractiveness (40 ratings/image). Twenty lookzone regions were mapped onto each facial image. A separate group of 265 subjects observed a randomly chosen subset of 40 images while an infrared eye-tracking camera recorded their pupillary response. Factorial ANOVA analysis was performed to determine significance of differences between groups.

**OUTCOMES MEASURED:** Image attractiveness was rated on a 1–7 Likert scale.
Ages of both individual photographed and eye-tracked observer were obtained.

The eye-tracking camera measured average pupil diameter/lookzone region during all image observations.

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

(i) cleft images: rated less attractive than control images
(ii) increasing age (image): associated with step-wise decrease in attractiveness in both cleft and control images
(iii) higher attractiveness (image): associated with larger average observer pupil size
(iv) increased age (observer): associated with smaller average observer pupil size

**CONCLUSIONS:** Cleft faces are rated as less attractive, and with increasing age attractiveness diminishes (paralleling the same phenomenon seen with control faces). Increasing age of the observer is associated with diminishing average pupil size, whereas more attractive facial images stimulate pupil dilation.

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**Robotic-Assisted Cleft Palate Repair: A Feasibility Study**

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**PURPOSE:** The number of applications in which robotic-assisted surgery are used has grown steadily, especially in the fields of transoral, reconstructive and microsurgery. We evaluate the robot in cleft palate repair by conducting a feasibility study.

**METHODS:** Eight cadaveric human heads were used to evaluate cleft palate repair and radical intravelar-veloplasty utilizing the Da Vinci robot. Dissection of the levator veli palatini with the robot was randomized to either the right or left side. The opposite side of the velum acted as the control and was dissected by hand. Times required to complete subsequent steps of the procedure using the robot were measured.

**RESULTS:** The time (seconds±SD) to perform a robotic dissection (491±90) of the levator muscle was equivalent to the time taken to perform a dissection by hand (552±140; p: 0.349). Time for repair of the levator (309±106) and oral-mucosa closure (1185±165) decreased with experience, while nasal-mucosa closure (980±190) did not. Based on average times, repair of a cleft palate with intravelar-veloplasty would take 57.4 minutes when all the steps are performed using the robot. Both the surgeon and the assistant felt the instrumentation was ergonomic and visibility was excellent. While there was no haptic feedback capability, no notable complications occurred.

**CONCLUSIONS:** Robotic-assisted repair of cleft palate defects with intravelar-veloplasty is feasible on adult cadavers and may provide enhanced visualization and ergonomics. There is a trend towards faster operating time with experience on the robot. Although untested in the pediatric population, robotic technology may offer a safe and effective technique.

**Utilizing Shear Stress to Optimize Endoluminal Linings within Pre-Vascularized Engineered Tissues**

**Julia L. Jin, BS; Omer E. Kaymakcalan, MD; Ross H. Weinreb, MS; Xue A. Dong, BA; Kerry A. Morrison, B.A; Rachel M. Akintayo, MD; Jason A. Spector, MD**

**INTRODUCTION:** Regeneration of thicker or larger tissues of clinically relevant size remains a challenge due to poor oxygen diffusion into cells that are contained within non-vascularized tissue-engineered constructs. In our previous work, we fabricated vascularized tissue engineered