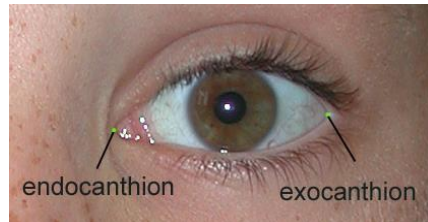# PALPEBRAL FISSURE LENGTH

FAS FACIAL PHOTOGRAPHIC SOFTWARE ACCURACY

PALPEBRAL FISSURE LENGTH

The palpebral fissure length (PFL) is the distance from the endocanthion to the exocanthion.

METHODS OF MEASUREMENT

Sliding Digital Calipers: The gold standard (or most accurate method) for measuring the PFL is the sliding digital caliper. This method only serves as the gold standard if the prongs of the caliper are placed directly on the endocanthion and exocanthion landmarks Unfortunately, it is not safe to measure a person's eye with a sliding digital caliper. There is too great a risk of poking the eye with the sharp prongs of the caliper.

Hand-held Ruler: A common method used to measure the PFL is a hand-held ruler, but it is extremely difficult to obtain accurate measures with a ruler due to parallax, alignment, and the fact that most patients are young 'moving targets'. These issues are demonstrated in an animated video presented on the FAS DPN website (http://depts.washington.edu/fasdpn/htmls/photo-face.htm). Measuring PFLs with a handheld ruler has been confirmed to be highly inaccurate based on published data collected on thousands of patients over 20 years in the FAS DPN clinic (see page e462. http://depts.washington.edu/fasdpn/pdfs/valid2013FAR.pdf).

Software: To improve measurement accuracy, the FAS Facial Photographic Analysis Software was developed that allows one to measure the PFL from a 2D photograph. The User simply clicks their computer mouse on the endocanthion and exocanthion landmarks in the photograph. The software automatically computes the PFL (adjusting for the foreshortening effect of a 2D photo). The software was calibrated to match the sliding digital caliper. The accuracy of the software's measure of the PFL is demonstrated in Astley, (2015).

DEMONSTRATION OF THE ACCURACY OF THE FAS FACIAL PHOTOGRAPHIC ANALYSIS SOFTWARE

Below are images that demonstrate the accuracy of the FAS Facial Photographic Software measurement of the PFL.

The left PFL of the same individual was measured using the following three methods:

1. Sliding digital calipers (Figure 1)
2. Hand-held ruler (Figure 2)
3. FAS Facial Photographic Analysis Software (Figure 3)

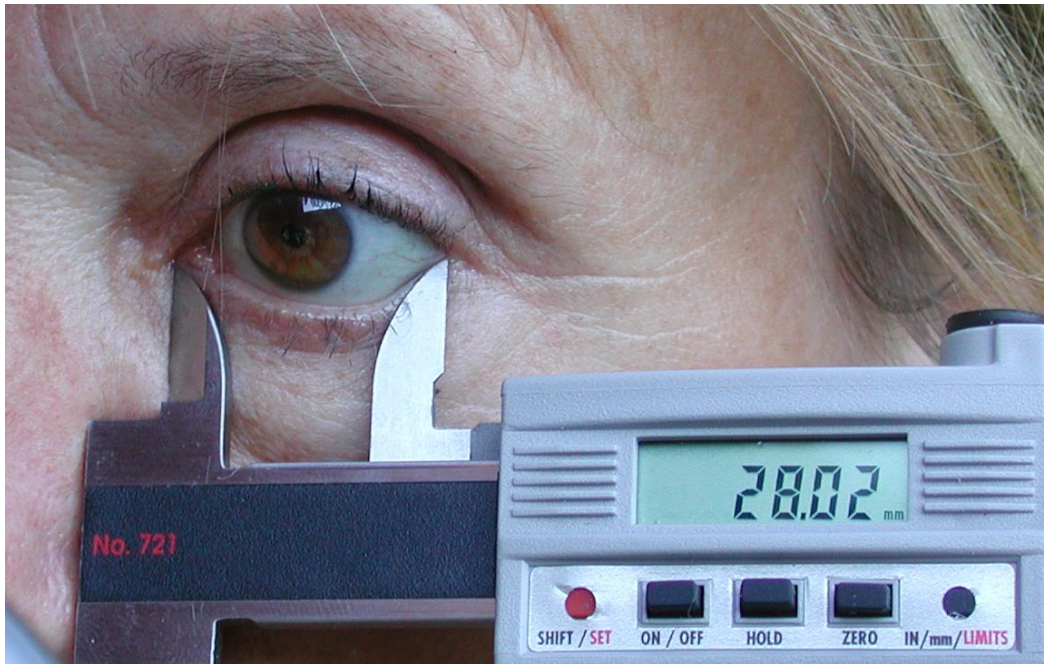Each method results in the same PFL (28.0 mm).

Figure 1. Sliding Digital Caliper Measure of PFL. 28.02 mm. To obtain an accurate measure, the calipers were held by the individual in the photo, and placed directly on the corners of the eye. THIS IS VERY RISKY AND SHOULD NEVER BE DONE WITH A PATIENT.

Figure 1. Ruler Measure of PFL. 28.0 mm. To obtain an accurate measure, the ruler had to be pressed against the subject's lower eyelid. For safety's sake, however, one should never touch the ruler to the patient's eye when measuring the PFL.
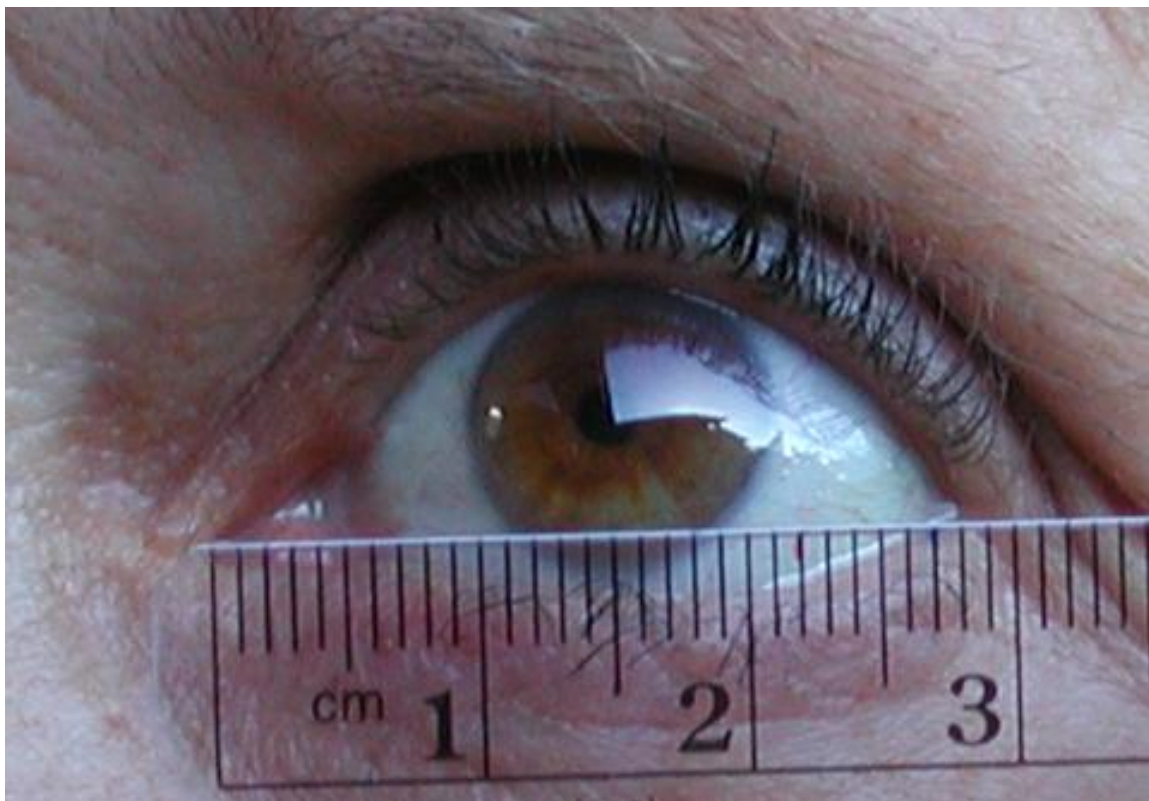
Figure 1 (enlarged). Caliper. <u>28.02 mm</u>

Figure 2 (enlarged). Ruler. <u>28 mm</u>

FAS Facial Photographic Analysis Report

Name	Pfl	Accuracy
	First — Middle	Last
Subject I.D.	None	
Source of Photo	FASDPN	
Gender	Female	
Race	Caucasian/Caucasian	
Birth Date	11/17/1955	

PHOTO ASSESSMENT

Normal PFL Chart: Scandinavian (Stromland '99)   Lip-Philtrum Guide:
Normal ICD Chart: Caucasian (Hall '89)

	Frontal	¾ View	Lateral
File Name	PFLaccuracy.JPG		
Date of Photo	9/6/2006		
Age (yrs) in photo	50.80		
Date of Photo Assessment	8/24/2014		
Photo Assessor	Astley		

Length of Real Internal Measure of Scale(sticker) placed on forehead (mm)   19.05
Length of Internal Measure of Scale in Frontal Photo (pixels)   195.1

	In photo (pixels)	True Length (mm)	Z-score
Left Palpebral Fissure Length:	261.0	28.0	-0.63
Right Palpebral Fissure Length:	261.0	28.0	-0.63
Mean Palpebral Fissure Length:	261.0	28.0	-0.63
Inner Canthal Distance (ICD):	306.2	True Distance (mm) 29.9	-0.56

Flat Philtrum (5-point rank):   In Frontal Photo ____   In ¾ Photo ____

Thin Upper Lip: Circularity (perimeter^2/area) ____   5-Point rank (Circ) ____   5-Point rank (Scale) ____

clown eyebrows ☐   ptosis ☐   strabismus ☐   epicanthal folds ☐

flat midface ☐   protruding ears ☐   flat nasal bridge ☐   hypertelorism ☐

Other anomalies present: None reported

Comments:
Other syndromes present: None reported

PHOTO QUALITY

	Frontal	¾ View	Lateral
Side showing			
Head rotation (5-point rank/degrees) to subject's Right (+) or Left (-)	0°		
Head tilt (5-point rank) toward subject's Right (+) or Left (-) shoulder			
Head tip (degrees) Up (+) or Down (-) from Frankfort Horizontal Plane	0°		
Exposure (3-point rank)	1 (good)		
Focus (3-point rank)	1 (good)		
Facial Expression (3-point rank)	1 (Relaxed)		
Reliability of ABC-Score for palpebral fissure length (5-point rank)	1 (very good)		
Reliability of ABC-Score for philtrum (5-point rank)			
Reliability of ABC-Score for upper lip (5-point rank)			

No Picture Available   No Picture Available

PFLaccuracy.JPG

OUTCOME

ABC-Score	A		
	PFL	Philtrum	Lip
Data Used	mean	3/4 View	circularity

4-Digit Diagnostic Code for Face ____

University of Washington FAS DPN FAS Facial Photographic Analysis Software © 2014

Figure 3. FAS Facial Photographic Analysis Software Measure of PFL. PFL = 28.0 mm.
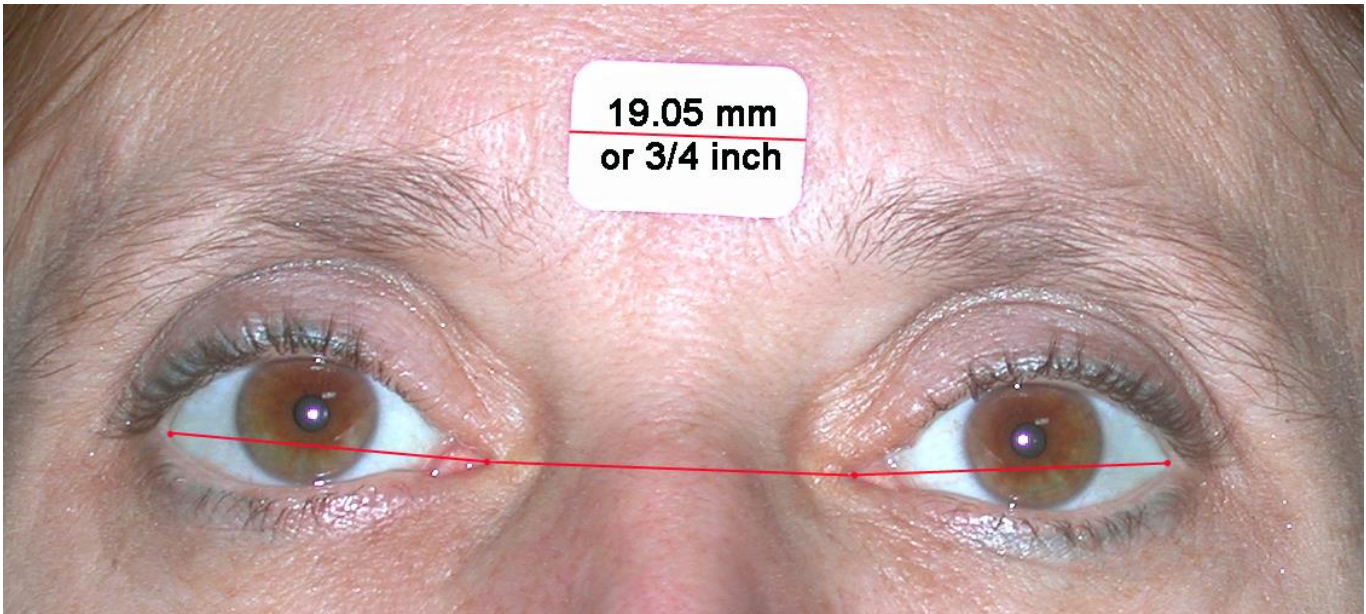
Figure 3. Enlargement of the Photograph used by the Software to Measure PFL. When the software User measures the width of the sticker, the right and left PFLs, and the distance between the eyes (e.g., inner canthal distance), the software draws a red line (like the ones depicted in the photo above) to document the starting-point and ending-point of each measure.