Photoanthropometry in forensics: Comparison of facial images with frontal and lateral views

Fotoantropometria para fins forenses: Análise facial comparativa entre imagens em norma frontal e lateral

Fotoantropometría con finalidad forense: Análisis facial comparativo entre imágenes estándar frontal y lateral

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Abstract
Photoanthropometry quantify the facial proportions of an individual facilitating the comparison of facial patterns for human identification. The coordinates and vertical distances in pixels of the photoanthropometric landmarks on images of the same individual in frontal and profile views were analyzed and compared. A total of 116 pairs of photographs of Brazilian individuals were evaluated. The photographs were adjusted in size and rotation, and marked in the software Two-dimensional Forensic Facial Analysis System. For each face, 16 landmarks were considered: glabella (g), nasion (n), ectocanthion (ec), pronasale (prn), subnasale (sn), alare (al), cheilion (ch), upper lip (ls), lower lip (li), stomion (sto), labiomental (lm), gnathion (gn), superaurale (sa), subaurale (sba), postaurale (pa) and upper ear lobe (slb); the x- and y-coordinates of each landmark were obtained. Twenty-seven vertical distances between the points were proposed, which were measured by subtracting the values of the y-coordinate. The data were analyzed descriptively and inferentially using the Kolmogorov-Smirnov test, intraclass correlation coefficient (ICC) and Mann-Whitney test (α=5%). The mean age of the sample was 25.9 years ($\pm$ 4.7), and 50.9% (n=59) were males. When the coordinates were evaluated, a low correlation was obtained between the images (ICC<0.4). Of the 27 proposed measures, 77.7% (n=21) indicated agreement between the images in the two views (p>0.05). A comparison of ls-g, sa-ec, pa-ec, slb-ec, sba-sa and slb-sa showed disagreement between the images. Therefore, there is agreement between the facial measures in the frontal and lateral images, except for ls-g and for the distances between the ear landmarks.
Keywords: Forensic dentistry; Face; Photographs.

Resumo
A fotoantropometria quantifica as proporções faciais de um indivíduo facilitando a comparação dos padrões faciais para identificação humana. Analisaram-se as coordenadas e distâncias verticais em pixels dos pontos de referência fotoantropométricos em imagens do mesmo indivíduo nas vistas frontal e de perfil. Avaliou-se 116 pares de fotografias de brasileiros, que foram ajustadas em tamanho e rotação, e marcadas no software SAFF-2D. Para cada face, 16 pontos de referência foram considerados: glabela (g), násio (n), ectocanto (ec), pronasal (prn), subnasal (sn), alar (al), chélio (ch), labial superior (ls), labial inferior (li), estômio (sto), labiomental (lm), gnátio (gn), supra-auricular (sa), subauricular (sba), pós-auricular (pa) e supralobular (slb); e obteve-se as coordenadas x e y de cada ponto. Foram propostas 27 distâncias verticais entre os pontos, que foram medidas subtraindo os valores da coordenada y. Os dados foram analisados descritiva e inferencialmente por meio dos testes de Kolmogorov-Smirnov, coeficiente de correlação intraclasse (ICC) e Mann-Whitney (α = 5%). A média de idade da amostra foi de 25,9 anos (± 4,7) e 50,9% (n = 59) eram do sexo masculino. Quando as coordenadas foram avaliadas, uma baixa correlação entre as imagens foi obtida (ICC <0,4). Das 27 medidas propostas, 77,7% (n = 21) indicaram concordância entre as imagens nas duas vistas (p> 0,05). Uma comparação de ls-g, sa-ec, pa-ec, slb-ec, sba-sa e slb-sa mostrou discordância entre as imagens. Portanto, há concordância entre as medidas faciais nas imagens em norma frontal e lateral, exceto para ls-g e para as distâncias entre os pontos das orelhas.
Palavras-chave: Odontologia Forense; Face; Fotografias.

Resumen
La fotoantropometría cuantifica las proporciones faciales de un individuo, lo que facilita la comparación de patrones faciales para la identificación humana. Coordenadas y distancias verticales, en píxeles, de los puntos de referencia fotoantropométricos fueron analizadas en imágenes frontales y laterales del mismo individuo. Se evaluaron 116 pares de fotografías de brasileños, ajustadas en tamaño y rotación, y marcadas en el software SAFF-2D, siendo utilizados 16 puntos de referencia en cada cara: glabela (g), nasion (n), ectocanto (ec), pronasal (prn), subnasal (sn), alar (al), chelium (ch), labio superior (ls), labio inferior (li), estomio (sto), labiomental (lm), gnathion (gn), supraauricular (sa), subauricular (sba), postauricular (pa) y supralobular (slb), y se obtuvieron las coordenadas x e y para cada punto. Se consideraron 27 distancias verticales, medidas substrayéndose los valores de la coordenada y. Los datos se analizaron de forma descriptiva e inferencial, mediante las pruebas de Kolmogorov-Smirnov, coeficiente de correlación intraclase (CCI) y Mann-Whitney (α = 5%). La edad media de la muestra fue de 25,9 años (± 4,7), con 50,9% (n = 59) del sexo masculino. Se obtuvo una baja correlación entre las imágenes (ICC <0,4) en la evaluación de las coordenadas. De las 27 medidas propuestas, 77,7% (n = 21) demostraron concordancia entre las imágenes en las dos tomas (p> 0,05). La comparación de ls-g, sa-ec, pa-ec, slb-ec, sba-sa y slb-sa demostró discrepancia entre las imágenes, constatándose concordancia entre las medidas faciales en las imágenes en norma frontal y lateral, excepto ls-g y las distancias entre los puntos de las orejas.
Palabras clave: Odontología Forense; Face; Fotografías.

1. Introduction

The individual characteristics of the human face facilitate identification of individuals (Tistarelli; Bicego; Grosso, 2009; Moreton; Morley, 2011). Certain techniques, such as anthropometry by means of bone landmarks and photogrammetry and cephalometry by means of photographic and radiographic images (Allanson, 1997), can be applied to craniofacial analysis.

Photoanthropometry is a relatively recent area of study that arose from the need to develop methods for anthropometric analysis of images. It is defined as a method of facial comparison that uses a metric approach via the distances between anthropometric points marked in facial photographs (Moreton; Morley, 2011). Thus, the method quantifies the characteristics and proportions of an individual based on the landmarks, angles and dimensions of their face in images (İşcan; Helmer, 1993; Porter; Doran, 2000).

This method is an important tool for estimating age, assessing sex and comparing facial patterns (Farrera; García-Velasco; Villanueva, 2016; Gonzalez; Machado; Michel-Crosato, 2018). Studies show that indices obtained from facial measurements in photographs show a strong correlation with the real measurements of the individual (Cattaneo et al., 2012).

In forensics, it is common for only images, in photographs or videos, to be available as a source for identifying subjects. Therefore, the photoanthropometric method needs to be studied so that it can be used to prevent and combat crimes that spread rapidly across the world, such as child pornography (Berkowitz, 2009).

In this sense, the Facial Identification Scientific Working Group (FISWG) recognizes photoanthropometry as one of the methods for facial identification, although the FISWG still limits its application as a facial comparison method, noting disadvantages such as the quality of the images, lack of a standardized set of landmarks used in the facial comparison, subjectivity in the detection, positioning and marking of the landmarks, and time for training and examination. Therefore, the FISWG suggests further studies assessing the reliability of the method (FISWG, 2020).

Investigations do not always have good-quality sources, either due to equipment or environmental limitations. To circumvent this issue, software and frameworks have been proposed to ensure that these factors are not impediments to obtaining good quality materials (Henriques et al., 2012).

With regard to the standardization of landmarks, to refine the marking of the examiners and make it as coordinated as possible, a manual was proposed that presents the photoanthropometric definition of each facial landmark and shows the interfaces in the program used for marking, describing the necessary commands and tools (Flores; Machado, 2017). One study compared landmarking based on the definitions of this manual with that of the classic method, based on the cephalometric definition of facial landmarks, and noted that the photoanthropometric approach improves the reproducibility and decreases the dispersion in the markings (Flores et al., 2019).

However, the positioning of individuals at angles other than the frontal angle is another very common problem and an obstacle that hinders the use of facial analysis. Thus, the present study aimed to explore facial analysis through the use of photoanthropometric landmarking in frontal and profile images, comparing the positions of the landmarks and the distances between them, to assess the agreement between the markings of images of the same individual.

2. Methodology

This is a retrospective documentary study, with primary data obtained from an unwritten source (Lakatos; Marconi, 2021), in which facial photographs, in frontal and lateral views, of the same individual were analyzed. It was submitted to and approved by the Research Ethics Committee under CAAE: 67264117.9.0000.5188.

All the images were exported from a civil database and randomly distributed in Two-dimensional Forensic Facial Analysis System software for frontal and lateral images, SAFF-2D® and SAFF-2D Profile®, developed by the National Forensics Institute of the Brazilian Federal Police.

Of the 188 pairs of images, 72 pairs were excluded due to the inability to view all the photoanthropometric landmarks proposed in this study. Therefore, the sample comprised 116 pairs of facial images of Brazilian individuals between 20 and 40 years old with equal proportions of sexes.

The photographs of the two views were then scaled by a single examiner, according to size, using CorelDRAW X6® software (Corel Corporation, Canada). For this purpose, the ectocanthion (the most lateral point of the eye) and superaurale (the uppermost point of the outer ear) were used as reference points. The rotation of the profile image was adjusted using the subaurale (lowest point of the earlobe) or subnasale (lowest point of the nose) as a reference, as shown in figure 1, depending on which point was more visible in the images of the two views. These reference points were chosen because they are easily visualized in both front and profile images.

Figure 1 Representation from front and side photographs in the process of adjusting size and rotation using the ectocanthion and subnasale as a reference points, using the CorelDRAW X6® software.
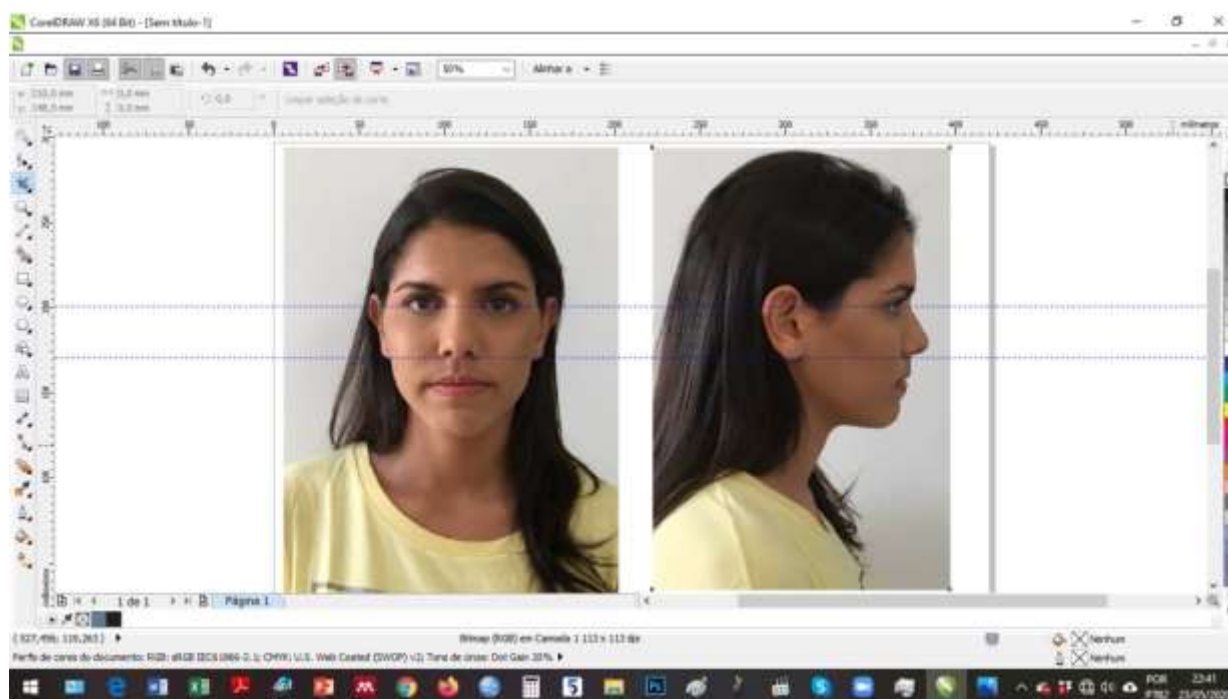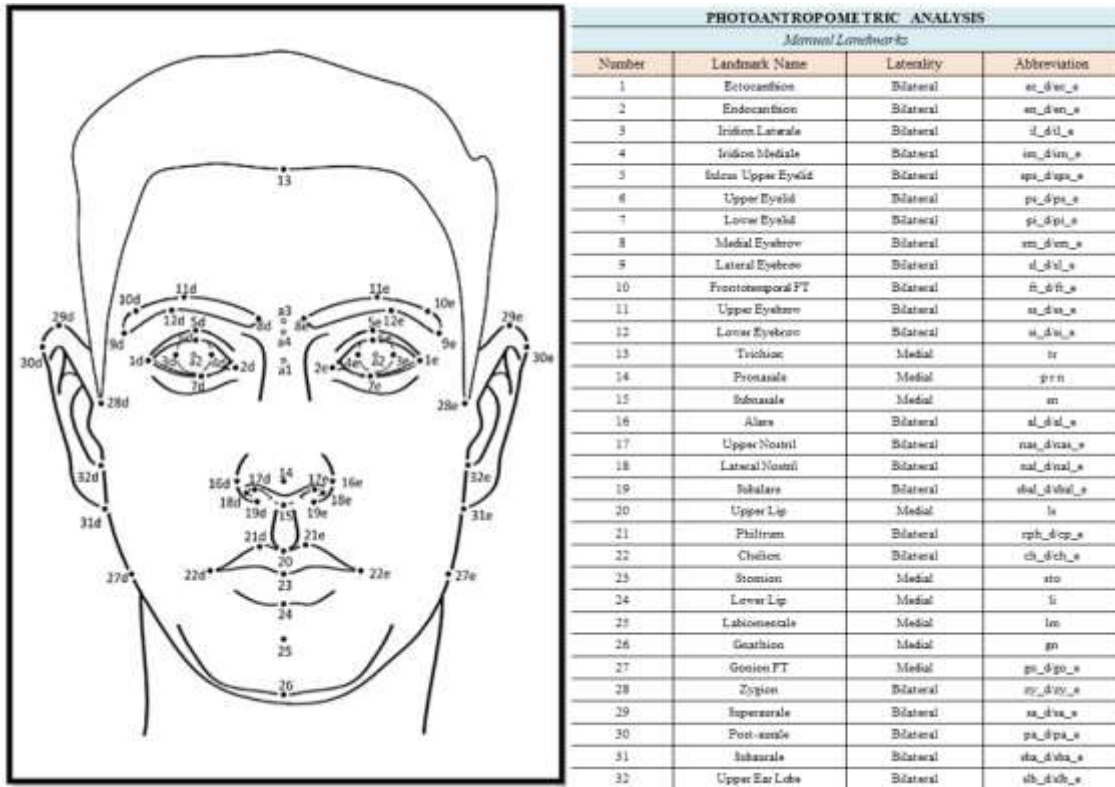

Source: Authors.

Then, each image was individually analyzed using SAFF-2D® and SAFF-2D Profile®, and two examiners marked 16 facial anatomical landmarks, as shown in Figures 2 and 3, visible in the photographs of the two views by means of the photoanthropometric adaptation proposed by Flores and Machado (2017), which is described in Table 1.

Table 1 Photoanthropometric definitions proposed by Flores and Machado (2017) for the 16 facial points used in this study.

| Photoanthropometric landmark	Definition
Glabella (g)	Intersection between the orbital midline and the horizontal line tangential to the upper edge of the supraorbital arches (*automated**).
Nasion (n)	Intersection of the orbital midline with the horizontal line passing the middle of the superior palpebral creases.
Ectocanthion (ec)	Most lateral point of the eye (distant from the midline), where the eyelids meet.
Pronasale (prn)	Most anterior point of the cartilaginous portion of the nose.
Subnasale (sn)	Lowermost point of the nose (columella base).
Alare (al)	Most lateral point of the nose wing.
Cheilion (ch)	Region of encounter of the upper and lower lip vermilion border (transition between the labial mucosa and the epidermis).
Upper Lip (ls)	Midpoint of the upper lip vermilion border. Lowermost point of the cupid's bow (when present).
Lower Lip (li)	Point of contact of the labial midline with the lowest point of the lower lip vermilion border.
Stomion (sto)	Midpoint of rima oris (dark line formed by union of upper and lower lips), marked on labial midline (average between the right and left cheilions).
Labiomental (lm)	Midpoint of the mentolabial sulcus (depression between the lower lip and chin).
Gnathion (gn)	Point on the labial midline that intersects the lowermost portion of the chin.
Superaurale (sa)	Uppermost point of the outer ear.
Subaurale (sbA)	Lowermost point of the earlobe.
Postaurale (pa)	Most lateral point of the outer ear.
Upper ear lobe (slb)	Visually, the lowest point of the intertragic notch of the outer ear.

*Landmarks generated automatically by the software and not manually defined by examiners.
Source: Flores & Machado (2017).

Figure 2 Illustration of the location of the marked photoanthropometric points in the facial photographs of the frontal norm using SAFF-2D ® software.

PHOTOANTROPOMETRIC ANALYSIS			
Manual Landmarks			
Number	Landmark Name	Laterality	Abbreviation
1	Ectocanthion	Bilateral	ec_d/ec_e
2	Endocanthion	Bilateral	en_d/en_e
3	Iridion Laterale	Bilateral	il_d/il_e
4	Iridion Mediale	Bilateral	im_d/im_e
5	Sulcus Upper Eyelid	Bilateral	spa_d/spa_e
6	Upper Eyelid	Bilateral	ps_d/ps_e
7	Lower Eyelid	Bilateral	pi_d/pi_e
8	Medial Eyebrow	Bilateral	em_d/em_e
9	Lateral Eyebrow	Bilateral	el_d/el_e
10	Frontotemporal FT	Bilateral	ft_d/ft_e
11	Upper Eyebrow	Bilateral	ss_d/ss_e
12	Lower Eyebrow	Bilateral	si_d/si_e
13	Trichion	Medial	tr
14	Pronasale	Medial	prn
15	Subnasale	Medial	sn
16	Alare	Bilateral	al_d/al_e
17	Upper Nostril	Bilateral	nas_d/nas_e
18	Lateral Nostril	Bilateral	nal_d/nal_e
19	Subalare	Bilateral	sbal_d/sbal_e
20	Upper Lip	Medial	ls
21	Philtrum	Bilateral	rph_d/cp_e
22	Cheilion	Bilateral	ch_d/ch_e
23	Stomion	Medial	sto
24	Lower Lip	Medial	li
25	Labiomentale	Medial	lm
26	Gnathion	Medial	gn
27	Gonion FT	Medial	go_d/go_e
28	Zygion	Bilateral	zy_d/zy_e
29	Superaurale	Bilateral	sa_d/sa_e
30	Post-aurale	Bilateral	pa_d/pa_e
31	Subaurale	Bilateral	sba_d/sba_e
32	Upper Ear Lobe	Bilateral	slb_d/slb_e

Source: Flores & Machado (2017).

Figure 3 Illustration of the location of the photoanthropometric landmarks in the facial photographs of the lateral view using the SAFF-2D® software.
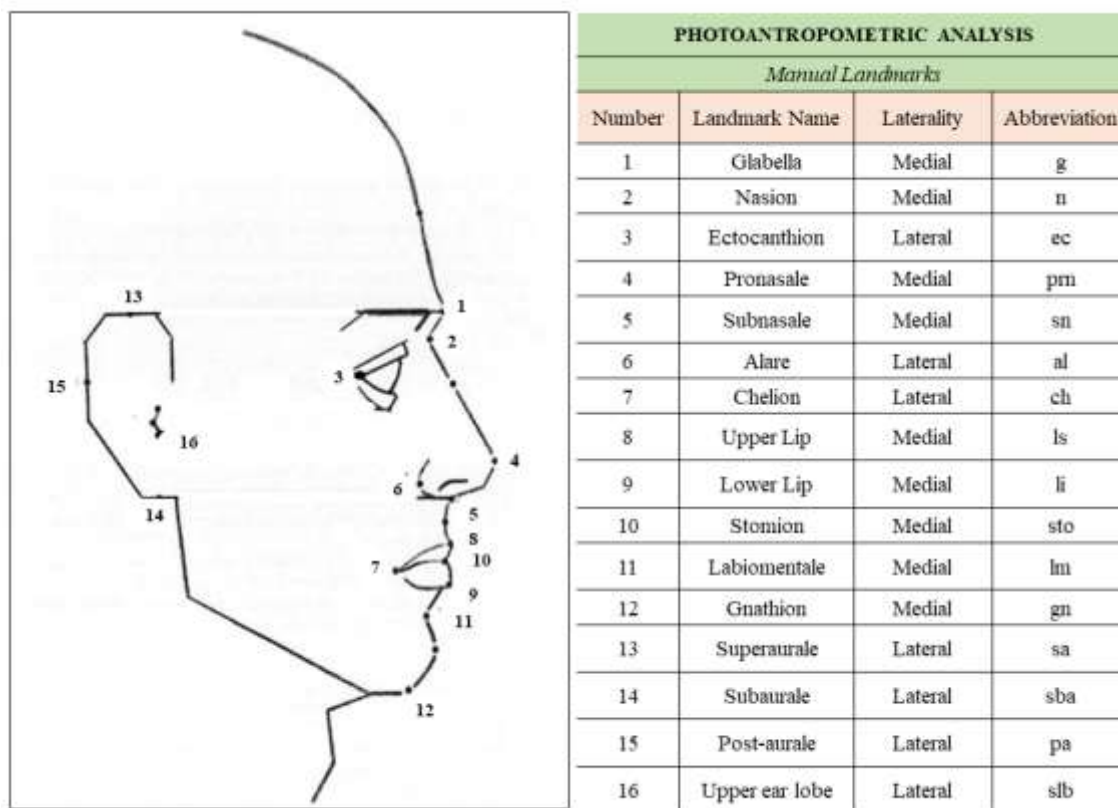
Source: Authors.

The intra- and interrater agreement was evaluated to assess the reliability of the markings. Initially, 10 images were marked by each examiner. After 30 days, the marking was repeated for the same photographs, and the correlation between the landmarks was analyzed using the intraclass correlation coefficient (ICC) (Shrout; Fleiss, 1979), which was also used to analyze the agreement between the coordinates of the landmarks in the front and profile images.

Then, the landmarks were identified in the sample, and the pixel coordinates of the respective x and y-axes were obtained. In addition, 27 vertical distances between the landmarks were proposed, as follows: *ls-sn, n-g, sn-g, ls-g, sto-g, li-g, gn-g, sn-n, ls-n, sto-n, li-n, gn-n, sto-sn, li-sn, gn-sn, sto-ls, li-ls, gn-ls, li-sto, gn-sto, gn-li, sa-ec, sba-ec, pa-ec, slb-ec, sba-sa* and *slb-sa*.

For standardization of the vertical measurements, the values corresponding to the y-coordinates were corrected. Initially, for each photoanthropometric landmark, the mean value of this coordinate was taken, which was defined as the correction factor. Subsequently, the correction factor was subtracted from the real coordinate value, and the corrected value was obtained. For the calculation of the vertical distances, the corrected values of the landmarks were subtracted for each proposed measure.

The data were analyzed in a descriptive and inferential manner using Microsoft Excel® 2013 and IBM SPSS® v.21 software. The images were initially compared using descriptive data, with the mean and standard deviation. The parameter normality was assessed using the Komolgorov-Smirnov (KS) test. The ICC was estimated in two distinct ways, single and average, using the absolute agreement as a measure. Cronbach's alpha (Cronbach, 1951) was also calculated to measure the level of agreement between the two markings in the frontal and lateral views because, compared to the ICC average, this term

assesses the existence of bias (Vargo, 2003). The Mann-Whitney test was applied to compare the vertical distances of the groups of frontal and profile images.

3. Results

The intrarater evaluation, which together with the interrater evaluation preceded the marking of the photographs of the sample, indicated low dispersion ($\leq$1 mm), with agreement in 78.1% (n=25) of the landmarks and ICC>0.8.

The mean age of the individuals photographed was 25.9 years ($\pm$ 4.7), and 50.9% (n=59) were males.

For all 16 photoanthropometric landmarks, low agreement was observed between the x- and y-coordinates obtained in the front and profile images, as all exhibited ICC <0.4, with ICC<0.1 in 25% (n=4), 0.1<ICC<0.2 in 68.8% (n=11), and ICC>0.2 in 6.2% (n=1). A comparison of the ICC average with Cronbach's alpha showed that because the values for both indices were equal, as shown in Table 2, indicating that there were no systematic errors.

Table 2 Intraclass correlation coefficients (ICC) and Cronbach's alpha (CA) for the coordinates of the photoanthropometric landmarks in the frontal and lateral images

Variables	Frontal		Lateral		ICC Single	ICC Average	CA
	Mean	SD	Mean	SD			
al_d_x	665.49	126.55	368.76	82.87	0.154	0.268	0.268
al_d_y	301.26	71.30	476.62	92.51	0.116	0.208	0.208
ch_d_x	803.97	152.70	279.33	67.15	0.157	0.271	0.271
ch_d_y	279.33	67.15	445.64	86.99	0.154	0.267	0.267
ec_d_x	510.85	97.84	243.49	70.02	0.190	0.319	0.319
ec_d_y	185.55	47.62	403.13	77.43	0.092	0.168	0.168
g_x	431.49	81.51	182.47	67.73	0.198	0.331	0.331
g_y	386.47	86.16	488.69	95.90	0.096	0.176	0.176
gn_x	992.81	212.89	635.70	124.84	0.133	0.234	0.234
gn_y	382.79	93.12	411.99	83.14	0.181	0.306	0.306
li_x	846.13	163.09	513.97	103.18	0.155	0.269	0.269
li_y	387.48	86.77	488.74	94.26	0.147	0.256	0.256
ls_x	774.40	147.34	448.42	94.81	0.156	0.270	0.270
ls_y	387.96	87.25	504.48	96.90	0.135	0.239	0.239
lm_x	877.85	169.85	542.04	108.46	0.153	0.266	0.266

lm_y	387.31	86.34	461.18	88.97	0.168	0.287	0.287
n_	482.77	91.50	220.92	69.99	0.170	0.291	0.291
n_y	386.47	86.16	477.05	93.92	0.109	0.197	0.197
pa_d_x	489.66	192.69	279.82	76.71	0.112	0.202	0.202
pa_d_y	11.43	9.26	20.10	16.15	0.116	0.208	0.208
prn_x	648.89	124.37	358.10	82.40	0.159	0.274	0.274
prn_y	388.27	86.61	552.43	108.39	0.122	0.217	0.217
sa_d_x	444.06	167.24	203.30	70.57	0.134	0.237	0.237
sa_d_y	32.32	16.04	78.95	22.34	0.115	0.206	0.206
sba_d_x	725.10	147.50	421.84	91.51	0.238	0.385	0.385
sba_d_y	85.40	26.92	123.35	28.77	0.053	0.102	0.102
slb_d_x	634.30	151.37	355.92	82.59	0.130	0.231	0.231
slb_d_y	78.80	29.05	133.90	29.93	0.082	0.151	0.151
sn_x	687.47	134.80	397.30	87.29	0.169	0.289	0.289
sn_y	387.17	86.98	500.43	97.53	0.137	0.241	0.241
sto_x	800.80	152.93	478.05	98.40	0.156	0.270	0.270
sto_y	387.68	86.87	481.54	92.79	0.144	0.252	0.252

Source: Authors.

In the table above, the ICC values call attention, which were low for all the points studied. This indicates that, in pairs of photographs, it is not recommended to analyze exclusively the values referring to the coordinates of the points, as they have low concordance with each other.

Of the 27 proposed measures, 77.7% (n=21) indicated agreement between the images of the two views (p>0.05). Only for distances ls-g, sa-ec, pa-ec, slb-ec, sba-sa and slb-sa was there disagreement between the images, as shown in Table 3.

Table 3 Comparison of the vertical distances obtained for the photoanthropometric landmarks in the frontal and lateral images.

Vertical distances	Frontal		Lateral		p-value
	Mean	SD	Mean	SD	
ls-sn	-0.07	17.247	-1.47	17.133	0.347
n-g	-0.47	12.043	0.50	12.270	0.733
sn-g	-0.26	58.139	1.49	47.635	0.058
ls-g	-0.12	71.453	0.03	57.776	**0.045**
sto-g	-1.41	77.278	0.44	62.473	0.083
li-g	-2.67	88.947	0.48	69.582	0.093
gn-g	-0.97	148.560	0.73	95.582	0.302
sn-n	0.21	47.625	0.99	40.975	0.090
ls-n	0.14	60.717	-0.47	50.613	0.066
sto-n	-0.95	66.542	-0.06	55.493	0.147
li-n	-2.21	78.360	-0.02	62.780	0.178
gn-n	-0.50	140.119	0.23	88.955	0.378
sto-sn	-1.16	22.567	-1.05	21.127	0.414
li-sn	-2.41	35.340	-1.01	27.951	0.204
gn-sn	-0.71	110.876	-0.76	53.441	0.852
sto-ls	-1.09	9.332	0.41	7.965	0.465
li-ls	-2.34	23.535	0.46	16.252	0.898
gn-ls	-0.64	104.345	0.71	41.884	0.677
li-sto	-1.26	18.152	0.04	9.637	0.611
gn-sto	0.45	102.149	0.29	36.266	0.644
gn-li	1.71	99.683	0.25	30.659	0.289
sa-ec	2.96	147.673	-1.78	34.350	**0.000**
sba-ec	0.44	60.482	-1.28	48.145	0.640
pa-ec	2.53	167.745	-1.27	34.972	**0.000**
slb-ec	0.88	109.835	-1.42	37.135	**0.039**
sba-sa	-2.52	154.470	0.51	47.498	**0.000**
slb-sa	-2.08	127.850	0.36	32.898	**0.000**

Source: Authors.

In this table it is important to note that when we work with distances between the points the results are more promising. The p value> 0.05 points out that there is no difference for measures in the photographs in one view or another, i.e. of the proposed measures, 21 are corresponding between the images of the same individual from the front or in profile.

4. Discussion

The facial analysis of photographs for the identification of criminals originated in the nineteenth century, from a method called Bertillonage based on body and facial measurements and morphological evaluations, and was incorporated by the American and British police in the early twentieth century (Wilkinson; Evans, 2009).

Since the advent of monitoring equipment for safety purposes, such as closed-circuit television (CCTV), circa 1985, in the United Kingdom (Wilkinson; Evans, 2009) and the rapid growth in the production of images, facilitated by the evolution of mobile phones, develop and/or improving identification methods from photographs or videos has been a goal in forensics.

Despite its relevance, there is still a shortage of publications in this area, including those regarding reliable methodologies of analysis, which leads to questions about the validity of the method (Alves et al., 2021) and, therefore, the forensic work performed based on these.

In this sense, Baldasso et al. (2016) stated that from reference points in distorted images, it is possible to obtain the ideal positions of these points by correcting the planar projection using frontal photographs as references for the images at different angles, similar to the method used in this study.

The facial comparison - or mapping - involves the description of the characteristics of a population, as well as the identification of individuals, and is applicable as evidence in various societies around the world (Akhter et al., 2013; Davis; Valeitine; Davis, 2010; Roelofse; Steyn; Becker, 2008; Ogawa et al., 2015). Studies seeking to evaluate facial growth or estimate age from landmarks in frontal photographs have achieved positive results with this method (Cattaneo et al., 2012; Borges et al., 2018; Machado et al., 2017), although they emphasize that each population requires a specific approach (Cattaneo et al., 2012; Machado et al., 2019).

The scaling technique aims to align the photographs and ensure that they match, enabling the images to be objectively analyzed and compared using quantitative procedures (Baldasso et al., 2016). For the alignment between pairs, three of the sixteen points were used; however, when comparing only the x- and y-coordinates of each point in the images in the two views, a low correlation was observed.

A study on photographs of male subjects of three European nationalities proposed 24 absolute measurements and 24 head and face indices with the goal of establishing a biological profile for identification purposes. The results showed that except for the labial width and intercanthal-mouth index, there were significant differences between the features of the three populations studied (Ritz-timme et al., 2011). These results are in line with the results described here, which showed agreement between most of the vertical distances proposed for comparing the faces of individuals photographed in two different views.

This is an important finding for forensics because it is common to have to use nonfrontal-view images as a source of information. Therefore, it is recommended that greater attention be paid to facial measurements because the vertical distances of a face in profile can be equivalent to those of the frontal view. In addition, the comparison of landmarks only based on the coordinates did not yield good results.

It should be noted that the data presented here represent a small sample of only young adults. Studies that comprise a larger population and other age groups should be developed, in particular to ensure that this is a useful method of analysis in the investigation of cases of child pornography, where knowledge of the age of the individual represented in the image is

essential for proving the materiality of the facts and deciding whether to escalate the punishment of the offender (Ferguson; Wilkinson, 2017).

5. Conclusion

In conclusion, photoanthropometry is applicable as a method of comparison between photographs of the same individual in frontal and lateral views because there is agreement between the observed vertical facial measurements. It should be emphasized that distances involving the ear landmarks are not yet reliable for comparison, and caution must be taken when adjusting the photographs to align the landmarks and standardize the measurements between the images in the two views.

It is suggested the continuity of research in more diverse samples, with images of individuals in profile and in different angles in order to confirm the result obtained from the proposed indexes adapting them to the forensic purposes.

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