

Analysis of the Morphometry and Morphology of the Foramen Ovale within the Black and White South African Population

Análisis de la Morfometría y Morfología del Foramen Oval
en la Población Sudafricana Blanca y Negra

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SUMMARY: The foramen ovale are bilateral oval-shaped openings located in the greater wing of the sphenoid bone in the human skull. Due to the variable morphometry and morphological traits of this foramen, this study aims to document the morphometry and morphology of the foramen ovale in a KwaZulu-Natal population group. The length (anterior-posterior diameter) and width (transverse diameter) of the foramen ovale was measured on 28 dry skull specimens (n=56). The morphometry, morphology and any variations of this foramen were recorded. In the present study the mean length observed was 7.95 ± 1.11 on the left side and 8.03 ± 1.24 on the right side. The males had wider and longer foramen ovale than the females. Furthermore, the mean length in the White population was larger than that in the Black-African population. Whilst the mean width in the Black-African population was larger than that in the White population. However, there was no statistical significant differences between right and left sides in both sexes and in both groups. The incidence of oval, round, almond, irregular and d-shaped foramen ovale observed in the present study were as follows: 41.10 %, 7.15 %, 10.70 %, 23.25 % and 7.10 % respectively. Additionally, 3.55 % variant shaped foramen ovale were found and 7.15% kidney shaped foramen ovale were documented. The foramen ovale is an essential foramen that transmits the accessory meningeal artery, mandibular nerve and lesser petrosal nerve. Knowledge of the foramen ovale is necessary to understand intracranial pathologies since this foramen is utilized in numerous diagnostic and invasive surgical procedures. Therefore, surgeons must be knowledgeable about its morphology and morphometry. Knowledge of this foramen is anatomically and clinically important as it may assist in trigeminal neuralgia and surgeries for neurological diseases. The morphometry and morphology of the foramen ovale in the Black and White South African population from KwaZulu-Natal presented with differences when compared to other population groups studied in literature.

KEY WORDS: Foramen ovale; Sphenoid; Morphometry; Morphology.

INTRODUCTION

The foramen ovale is located posterolateral to foramen rotundum, anterior to foramen lacerum and antero-medial to foramen spinosum (Drake *et al.*, 2010, Mishra *et al.*, 2016). According to Somesh *et al.* (2011), the foramen ovale is situated in the posterior part of the greater wing of the sphenoid bone. The foramen ovale is an integral component of the cranial anatomy as it is responsible for transmitting the lesser petrosal nerve, mandibular branch of the trigeminal nerve, an emissary vein and occasionally the accessory middle meningeal artery (Drake *et al.*, 2010, Somesh *et al.*, 2011, Murugan and Saheb, 2014, Patel and Mehta, 2014, Ravinthar & Thenmozhi, 2015, Mishra *et al.*, 2016). The foramen ovale varies in size and shape (Khan *et al.*, 2012). Numerous studies

have shown differences in the mean length and width of foramen ovale in different population groups and genders on both the right and left sides (Somesh *et al.*, 2011, Burdan *et al.*, 2011, Gupta & Rai, 2013, Murugan & Saheb, 2014, Kanyata *et al.*, 2015, Ravinthar & Thenmozhi, 2015, Mishra *et al.*, 2016). Previous studies documented that the differences observed in the mean lengths of foramen ovale in males and females were considered to be statistically insignificant (Burdan *et al.*, 2011, Mishra *et al.*, 2016). Moreover, Burdan *et al.* (2011) and Mishra *et al.* (2016), showed that males had a greater mean width than females and this difference was considered to be statistically insignificant. Studies have observed various other shapes like round, almond, irregular

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and slit (Somesh *et al.*, 2011, Gupta & Rai, 2013, Murugan & Saheb, 2014, Mishra *et al.*, 2016). Furthermore, Mishra *et al.* (2016) further classified the foramen ovale as being D-shaped and observed that its outline was not always regular or smooth. In 2006 Bilodi observed unique triangular shaped foramen ovale. Several studies have also recorded several different abnormal morphologies of the foramen ovale including the presence of bony spurs, spines, septa, tubercles and ossified ligaments (B?aszczyk *et al.*, 1980, Lang *et al.*, 1984, Kapur *et al.*, 2000, Mishra *et al.*, 2016). The dimensions, shapes and variations of the foramen ovale are significant since it is an important landmark for middle cranial fossa surgery; and it is utilized in numerous diagnostic and invasive surgical procedures including percutaneous biopsies and trigeminal neuralgia (Somesh *et al.*, 2011, Gupta & Rai, 2013, Murugan & Saheb, 2014, Mishra *et al.*, 2016).

Aim

To document the morphometry and morphology of the foramen ovale within the Black and White South African population from KwaZulu-Natal.

Methodology

Twenty-eight skulls (n=56) were obtained from Clinical Anatomy in the School of Laboratory Medicine and Medical Science, University of KwaZulu-Natal. The bones were from the Black African and White population. Ethical Clearance was obtained from the Biomedical Research Ethics Committee (BE384/17). The length (i.e. anterior-posterior diameter) of the foramen ovale was measured from the pterygoid process to the ridge found between foramen ovale and foramen spinosum on the outer surface of the skull (Fig. 1).

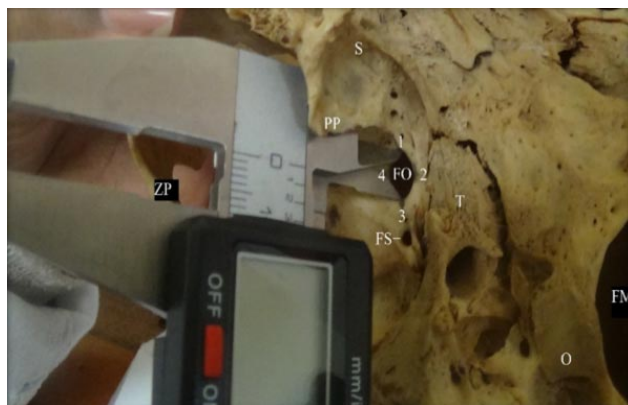


Fig. 1. Measurement of the anterior-posterior diameter of the foramen ovale. 1. Anterior; 2. Medial; 3. Posterior; 4. Lateral; FM-Foramen magnum; FO. Foramen ovale; FS. Foramen spinosum; O. Occipital bone; P.P.Pterygoid plate; S.Sphenoid bone; T.Temporal bone; ZP. Zygomatic process

The width (transverse diameter) of foramen ovale was perpendicular to that of the anterior-posterior diameter (Fig. 2).

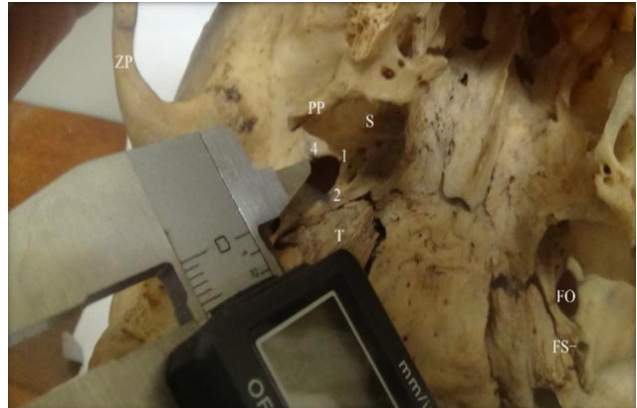


Fig. 2. Measurement of the transverse diameter of the foramen ovale. 1. Anterior; 2. Medial; 4. Lateral; FO- Foramen ovale; FS- Foramen spinosum; P.P-Pterygoid plate; S-Sphenoid bone; T-Temporal bone; ZP-Zygomatic process.

The morphology and any variations of this foramen were also recorded. The classification of the morphology of the foramen ovale was according to what several authors from past studies utilized (Bilodi, 2006, Somesh *et al.*, 2011, Wadhwa *et al.*, 2012, Philips & Bilodi, 2013, Gupta & Rai, 2013, Murugan & Saheb, 2014, Patel & Mehta, 2014, Mishra *et al.*, 2016).

Statistical analysis was performed using SPSS version 24.

The statistical tests conducted on the morphometric parameters were Descriptive Statistics and the Independent Samples T Test. A correlation between the variables were investigated using the Pearson Chi squared test. A p-value of less than 0.05 was deemed statistically significant.

RESULTS

Prevalence and incidence. The foramen ovale was present bilaterally in 100% (28/28) of the specimens. Nineteen skulls (19/28) were males whilst nine skulls (9/28) were female. Twenty-four skulls (24/28) were from the Black-African population and four skulls (4/28) were from the white population.

Morphometry

Sex. In the present study, the mean length of foramen ovale for males and females was 7.95 ± 1.11 mm on the left side and 8.03 ± 1.24 mm on the right side, as shown in Table I.

The mean length of foramen ovale was 8.14 ± 1.22 mm on the left side and 8.31 ± 1.32 mm on the right side in

males (Table I). Whilst in females the mean length observed on the left and right sides were 7.54 ± 0.73 mm and 7.42 ± 0.78 mm, respectively (Table II). However, these differences in the length of the right and left foramen ovale was considered to be statistically insignificant ($p > 0.05$).

In addition, sex had an insignificant weak correlation with the left length ($r = -0.26$) and right length ($r = -0.34$).

The mean width of the foramen ovale observed for males and females was 5.09 ± 0.93 mm on the left side and

4.75 ± 0.54 mm on the right side, shown in Table I. The mean width of foramen ovale was 5.26 ± 0.99 mm on the left side and 4.80 ± 0.59 mm on the right side in males (Table I). Whilst the mean width observed in females on the left and right sides were 4.73 ± 0.72 mm and 4.64 ± 0.40 mm respectively (Table I). However, the differences in the width of the right and left foramen ovale for males and females was considered to be statistically insignificant ($p > 0.05$).

In addition, sex had an insignificant weak correlation with the left width ($r = -0.27$) and right width ($r = -0.15$).

Table I. Diameters vs sex.

Diameters	Sex	N	Mean \pm Standard deviation (mm)	Minimum (mm)	Maximum (mm)	P-value
Left Length	Male	19	8.14 ± 1.22	5.47	10.02	0.099
	Female	9	7.54 ± 0.73	6.71	8.86	
	Total	28	7.95 ± 1.11	5.47	10.02	
Right Length	Male	19	8.31 ± 1.32	5.99	11.09	0.094
	Female	9	7.42 ± 0.78	6.16	8.28	
	Total	28	8.03 ± 1.24	5.99	11.09	
Left Width	Male	19	5.26 ± 0.99	3.84	7.97	0.210
	Female	9	4.73 ± 0.72	3.74	5.98	
	Total	28	5.09 ± 0.93	3.74	7.97	
Right Width	Male	19	4.80 ± 0.59	3.69	5.65	0.389
	Female	9	4.64 ± 0.40	4.06	5.32	
	Total	28	4.75 ± 0.54	3.69	5.65	

Ancestry

The mean length of foramen ovale in the Black-African population was 7.93 ± 1.05 mm on the left side and 8.02 ± 1.30 mm on the right side, shown in Table II. Whilst in

the white population the mean length observed on the left and right sides were 8.03 ± 1.58 mm and 8.04 ± 0.93 mm, respectively (Table II). However, these differences in the length of the right and left foramen ovale was considered to be statistically insignificant ($p > 0.05$).

Table II. Diameters vs ancestry.

Diameters	Ancestry	N	Mean \pm Standard Deviation (mm)	Minimum (mm)	Maximum (mm)	P-values (mm)
Left Length	Black	24	7.93 ± 1.05	5.47	9.70	0.948
	White	4	8.03 ± 1.58	6.74	10.02	
Right Length	Black	24	8.02 ± 1.30	5.99	11.09	0.948
	White	4	8.04 ± 0.93	7.02	8.95	
Left Width	Black	24	5.10 ± 0.70	4.20	6.66	0.189
	White	4	4.99 ± 2.01	3.74	7.97	
Right Width	Black	24	4.77 ± 0.52	3.69	5.65	0.470
	White	4	4.61 ± 0.72	3.97	5.62	

The mean width of foramen ovale in the Black-African population was 5.10 ± 0.70 mm on the left side and 4.77 ± 0.52 mm on the right side, shown in Table II. Whilst the mean width observed in the white population on the left and right sides were 4.99 ± 2.01 mm and 4.61 ± 0.72 mm respectively (Table II). However, these differences in the width of the right and left foramen ovale was considered to be statistically insignificant ($p > 0.05$).

Morphology

The incidence of oval, round, almond, irregular and d-shaped foramen ovale observed in the present study were as follows: 41.10 % (23/56), 7.15 % (4/56), 10.70 % (6/56), 23.25 % (13/56) and 7.10% (4/56) respectively. Fig. 3.

3.55 % (2/56) variant foramen ovale was observed, and these weren't classified since they had an incomplete ridge present which resulted in the confluence of the foramen ovale and foramen spinosum.

Variation

A kidney shape appearance was present in 7.15% (4/56) of the foramen ovale.



Fig. 3. Oval shaped Foramen ovale. 1. Anterior; 2. Medial; 3. Posterior; 4. Lateral; FO. Foramen ovale; FS. Foramen spinosum; P.P.Pterygoid plate; S. Sphenoid bone; T.Temporal bone; ZP. Zygomatic process.



Table III. The frequency of the different shapes found on the left and right sides.

SHAPES	SCHEMATIC DIAGRAM	Left Shape		Right Shape	
		Frequency	Frequency	Frequency	Frequency
Oval		8	28.60 %	15	53.60 %
Round		4	14.30 %	0	0.00 %
almond		4	14.30 %	2	7.10 %
irregular		8	28.60 %	5	17.90 %
d-shaped		2	7.10 %	2	7.10 %
variation		2	7.10 %	0	0.00 %
Kidney		0	0.00 %	4	14.30 %
Total	-----	28	100.00 %	28	100.00 %

There were tubercles present on two sides (2 left, 0 right), as well as two spines (0 left, 2 right) present on the margin of the foramen ovale in the base of skull (Fig. 5).

Furthermore, one foramen ovale on the right side had an incomplete medial margin. The morphology present of the different genders and population groups are shown in Tables 4 and 5. The foramen ovale of the males and Black-African in this study were predominantly oval shaped whilst the foramen ovale in females and Whites were predominantly both oval and irregular shaped.

In addition, sex had an insignificant weak correlation with the left shape ($r= 0.13$) and right length ($r= -0.004$).

Fig. 4. Foramen ovale with an incomplete ridge. 1. Anterior; 2. Medial; 3. Posterior; 4. Lateral; FO. Foramen ovale; Ridge found between foramen ovale and foramen spinosum; S.Sphenoid bone; T.Temporal bone.

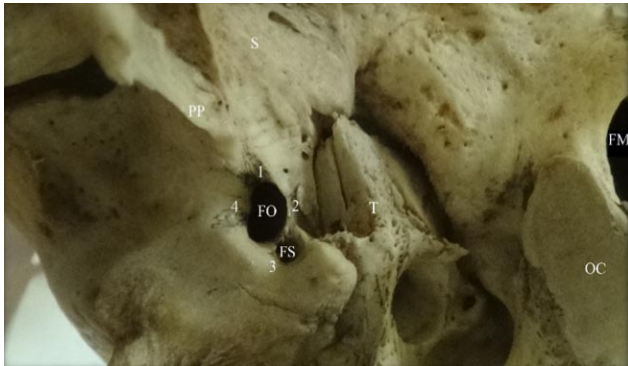


Fig. 5. Kidney shaped foramen ovale located anterior to foramen spinosum (FS). 1. Anterior; 2. Medial; 3. Posterior; 4. Lateral; FM. Foramen magnum; FO. Foramen ovale; FS. Foramen spinosum; OC. Occipital condyles; P.P. Pterygoid plat; S.Sphenoid bone; T.Temporal bone.

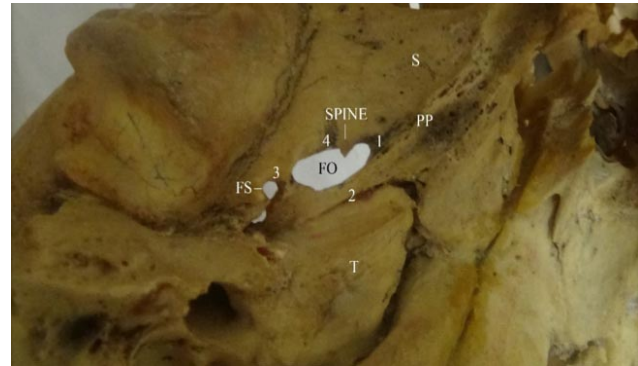


Fig. 6. Foramen ovale with spine on the anterior- lateral margin. 1. Anterior; 2. Medial; 3. Posterior; 4. Lateral; FO. Foramen ovale; FS. Foramen spinosum; P.P. Pterygoid plate; S.Sphenoid bone; T. Temporal bone

Table IV. The frequency of the different shapes found on the left and right sides in males and females.

SHAPES	Left Shape		Total	Right Shape		Total
	Male	Female		Male	Female	
Oval	7	1	8	11	4	15
Round	3	1	4	0	0	0
Almond	2	2	4	0	2	2
Irregular	4	4	8	4	1	5
d-shaped	1	1	2	0	2	2
Variation	2	0	2	0	0	0
Kidney	0	0	0	4	0	4
Total	19	9	28	19	9	28

Table V. The frequency of the different shapes found on the left and right sides in the different populations groups.

SHAPES	Left Shape		Total	Right Shape		Total
	Black-African	White		Black-African	White	
Oval	7	1	8	13	2	15
Round	4	0	4	0	0	0
Almond	3	1	4	2	0	2
Irregular	6	2	8	4	1	5
d-shaped	2	0	2	2	0	2
Variation	2	0	2	0	0	0
Kidney	0	0	0	3	1	4
Total	24	4	28	24	4	28

DISCUSSION

The foramen ovale is essential in several diagnostic and invasive surgical procedures. It is also a significant landmark for middle cranial fossa surgery (Somesh *et al.*, 2011, Gupta & Rai, 2013, Murugan & Saheb, 2014, Ravinthar & Thenmozhi, 2015, Mishra *et al.*, 2016). In addition, knowledge of potential variations of foramen ovale can be essential for forensic, academic, clinical and anthropological purposes (Wadhwa *et al.*, 2012, Gupta & Rai, 2013, Patil *et al.*, 2013). Hence it is essential for surgeons as well as

anthropologists to have accurate knowledge of the foramen ovale's dimensions, shapes and anatomical variations (Somesh *et al.*, 2011, Wadhwa *et al.*, 2012, Patil *et al.*, 2013, Murugan & Saheb, 2014).

Morphometry

Length. The mean length of the foramen ovale in males and females was 7.95 ± 1.11 mm on the left side and 8.03 ± 1.24 mm on the right side in this study. Several other authors documented mean lengths of the foramen ovale that were similar to the mean lengths of the present study (Somesh *et al.*, 2011, Philips & Bilodi, 2013, Kanyata *et al.*, 2015). Whilst other authors recorded the foramen ovale to have smaller mean lengths compared to that of the current study (Osunwoke *et al.*, 2010, Wadhwa *et al.*, 2012, Gupta & Rai, 2013, Patil *et al.*, 2013, Patel & Mehta, 2014, Ravinthar & Thenmozhi, 2015). Murugan & Saheb (2014), documented

that the mean length of the foramen ovale was 8.5 ± 1.31 mm on the left side and 8.9 ± 1.67 mm on the right side, which is larger compared to this study. The range of the length of foramen ovale in males and females was 5.47-10.02 mm on the left side and 5.99-11.09 mm on the right side.

Both the males and females from a Polish study were recorded to have smaller mean lengths on both sides, compared to the mean lengths obtained in this study (Burdan *et al.*, 2011). The mean length for females observed in a study

conducted by Mishra *et al.* (2016), was very similar to this study however the present study documented larger mean lengths for males than compared to Mishra *et al.* (2016). The mean length of the foramen ovale of males in the current study were larger than the females. However, these differences observed in the length of the right and left foramen ovale was considered to be statistically insignificant ($p > 0.05$), which is in agreement with Mishra *et al.* (2016). Similarly in the study conducted by Burdan *et al.* (2011), the length and width of the foramen ovale was insignificantly higher in males than in females.

The mean length on both sides in the White population was larger than that in the Black-African population. However, these differences in the length of the right and left foramen ovale was considered to be statistically insignificant ($p > 0.05$).

Width. The mean width observed in the males and females was 5.09 ± 0.93 mm on the left side and 4.75 ± 0.54 mm on the right side. Somesh *et al.* (2011) and Patil *et al.* (2013), recorded mean widths of the foramen ovale that were similar to the mean widths of the present study. However numerous other authors recorded mean widths that were smaller than those in this study (Osunwoke *et al.*, 2010, Wadhwa *et al.*, 2012, Gupta & Rai, 2013, Philips & Bilodi, 2013, Murugan & Saheb, 2014, Patel & Mehta, 2014, Kanyata *et al.*, 2015, Ravinthar & Thenmozhi, 2015). The range of the width of foramen ovale in males and females was 3.74-7.97 mm on the left side and 3.69-5.65mm on the right side.

The mean width of the foramen ovale in males was 5.26 ± 0.99 mm on the left side and 4.80 ± 0.59 mm on the right side, whereas the mean width observed in females was 4.73 ± 0.72 mm and 4.64 ± 0.40 mm on the left and right sides respectively. Both Burdan *et al.* (2011), and Mishra *et al.* (2016), documented mean widths in males and females that were smaller than those observed in this study. The males in the present study had wider foramen ovale than the females which also observed in the studies conducted by Burdan *et al.* (2011), and Mishra *et al.* (2016). However, these differences observed in the width of the right and left foramen ovale was considered to be statistically insignificant ($p > 0.05$), which is in agreement with Mishra *et al.* (2016). Similarly in the study conducted by Burdan *et al.* (2011), the width of the foramen ovale was insignificantly higher in males than in females

The mean width on both sides in the Black-African population was larger than that in the White population. However, these differences in the width of the right and left foramen ovale was considered to be statistically insignificant ($p > 0.05$).

Morphology

The foramen ovale were predominantly oval shaped (41.10%) in the present study as reported in previous studies (Bilodi, 2006, Somesh *et al.*, 2011, Wadhwa *et al.*, 2012, Philips & Bilodi, 2013, Gupta & Rai, 2013, Murugan & Saheb, 2014, Patel & Mehta, 2014, Mishra *et al.*, 2016). Numerous authors all reported that the foramen ovale had a higher incidence of the almond shape than round which the current study is in agreement with (Somesh *et al.*, 2011, Wadhwa *et al.*, 2012, Philips & Bilodi, 2013, Gupta & Rai, 2013, Murugan & Saheb, 2014, Mishra *et al.*, 2016). Whereas Bilodi (2006) and Patel and Mehta (2014), both reported in their studies that the round shape was more typical than the almond shape. Furthermore, several authors observed the foramen ovale was slit and triangular shaped however, the present study did not document these two shapes (Bilodi, 2006, Wadhwa *et al.*, 2012, Gupta & Rai, 2013, Patel & Mehta, 2014, Mishra *et al.*, 2016). The present study and Bilodi (2006), documented that the irregular shape was the second most typical shape observed in the foramen ovale. In addition, past studies as well as the present study documented D-shaped foramen ovale (Philips & Bilodi, 2013, Mishra *et al.*, 2016). This study also observed two variant shaped (2/56; 3.55 %) foramen ovale which could not be classified. In addition, a unique kidney shaped (4 5/6; 7.15 %) foramen ovale were documented for the first time in the present study.

The foramen ovale of the males and Black-Africans in this study were predominantly oval shaped whilst the foramen ovale in females and Whites were predominantly both oval and irregular shaped. The D-shape was least observed foramen ovale shape in males whilst there were no variant and kidney shaped foramen ovale in females. The kidney shape was the least observed foramen ovale shape in Black-Africans whilst there was no round, d-shaped and variant foramen ovale in the white population.

Anatomical variations were documented in the present study. Bony outgrowths, such as tubercles (3.57 %), which protruded from the margin of the foramen ovale, as well as spines (3.57 %) were present on the margin of the foramen ovale (Somesh *et al.*, 2011, Khan *et al.*, 2012, Wadhwa *et al.*, 2012, Gupta & Rai, 2013, Philips & Bilodi, 2013, John & Thenmozhi, 2015, Mishra *et al.*, 2016). Furthermore, 1.79 % of foramen ovale exhibited an incomplete medial margin. The two-variant shaped foramen ovale observed in this study, were not classified since an incomplete ridge was present between the foramen ovale and foramen spinosum. This resulted in the confluence of these two foramina and they therefore could not be individually distinguished (Mishra *et al.*, 2016). This incomplete ridge was present as two bony spines, one from the medial and one from the lateral margin, which divided

the foramen ovale in to two incomplete compartments namely an anterior foramen ovale and a posterior foramen spinosum (Khan *et al.*, 2012).

Several authors have also reported the presence of a bony spur which resulted in a compartmentalized foramen ovale (Reymond *et al.*, 2005, Osunwoke *et al.*, 2010, Mishra *et al.*, 2016). Ray *et al.* (2005), Khan *et al.* (2012) and Wadhwa *et al.* (2012), recorded that the appearance of bony structures (tubercles, spines, bony plates or spurs) show evidence of bony overgrowth whilst in the developmental phase in between its initial appearance and the formation of its perfect ring. Furthermore, the presence of variable groove patterns and foramen around the foramen ovale can be seen as a result of the interaction of the different components of the membranous bone and the emissary venous plexus (from middle meningeal veins to pterygoid plexus) (Wadhwa *et al.*, 2012). According to Wadhwa *et al.* (2012), ectopic or accessory foramen ovale can also form whilst the inconsistent foramina disappear, resulting in one large oval foramen, which was not observed in the present study.

The partitioning of the foramen ovale into compartments could result in the mandibular nerve being compressed which can then later lead to neuralgia throughout the preauricular and mandibular area of the face, as well as motor signs like the paralysis of the muscles that develop from the first branchial arch's mesoderm (Mishra *et al.*, 2016). However due to the deficiency of the relevant clinical histories those correlations mentioned above were not confirmed by Mishra *et al.* (2016). Additionally, such bony obstructions may interfere with the placement of transcutaneous needles into the foramen ovale and the presence of accessory bony variations on the foramen ovale's margin may accidentally suggest the presence of pathological changes on radiographs in some cases (Mishra *et al.*, 2016).

CONCLUSION

The present study documented that the foramen ovale in the Black and White South African population from KwaZulu-Natal differed according to symmetry, dimensions and may displays anatomical variations. Accessory bony structures like tubercles and spines as well as an incomplete medial margin were observed and an incomplete ridge was present between the foramen ovale and foramen spinosum. These variations may be due to developmental reasons and may seriously impact therapeutic and diagnostic procedures through the foramen ovale. Through analysing the length and width of the foramen ovale, this study observed no statistical significant differences between right and left sides in both sexes and in both groups. Furthermore, values of this study could be compared favourably with the literature. Therefore,

accurate knowledge of the dimensions, shapes and anatomical variations of the foramen ovale is essential for forensic, academic, clinical and anthropological purposes.

HEERALALL, C.; PILLAY, P.; DE GAMA, B.Z. & RENNIE, C. Análisis de la morfometría y morfología del foramen oval en la población sudafricana blanca y negra. *Int. J. Morphol.*, 43(2):450-457, 2025.

RESUMEN: El foramen oval es bilaterales tiene una forma ovalada y se localizan en el ala mayor del hueso esfenoides en el cráneo humano. Debido a la morfometría variable y los rasgos morfológicos de este foramen, este estudio tuvo como objetivo documentar la morfometría y morfología de este foramen en un grupo de población de KwaZulu-Natal. Se midió la longitud (diámetro anteroposterior) y el ancho (diámetro transversal) del foramen oval en 28 especímenes de cráneo seco (n = 56). Se registraron la morfometría, la morfología y cualquier variación de este foramen. La longitud media observada fue de $7,95 \pm 1,11$ en el lado izquierdo y $8,03 \pm 1,24$ en el lado derecho. Los hombres tenían el foramen oval más ancho y más largo que las mujeres. Además, la longitud media en la población blanca fue mayor que el de la población negra-africana. Mientras que el ancho medio en la población negra-africana fue mayor que en la población blanca. Sin embargo, no hubo diferencias estadísticamente significativas entre los lados derecho e izquierdo en ambos sexos y en ambos grupos. La incidencia de foramen oval ovalado, redondo, almendrado, irregular y en forma de D observado en el estudio fue el siguiente: 41,10 %, 7,15 %, 10,70 %, 23,25 % y 7,10 %, respectivamente. Además, se encontró un 3,55 % de foramen oval con forma variante y se documentó un 7,15 % de foramen oval con forma de riñón. El foramen oval es un foramen esencial por el que pasan la arteria meníngea accesoria, el nervio mandibular y el nervio petroso menor. El conocimiento del foramen oval es necesario para comprender las patologías intracraneales, ya que este foramen se utiliza en numerosos procedimientos quirúrgicos diagnósticos e invasivos. Por lo tanto, los cirujanos deben conocer su morfología y morfometría. El conocimiento de este foramen es anatómica y clínicamente importante, ya que puede ayudar en la neuralgia del trigémino y en las cirugías de enfermedades neurológicas. La morfometría y la morfología del foramen oval en la población sudafricana negra y blanca de KwaZulu-Natal presentaron diferencias en comparación con otros grupos de población estudiados en la literatura.

PALABRAS CLAVE: Foramen oval; Esfenoides; Morfometría; Morfología.

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