Collaborative Testing Services, Inc
FORENSIC TESTING PROGRAM

P.O. Box 650820
Sterling, VA 20165-0820
e-mail: forensics@cts-interlab.com
Telephone: +1-571-434-1925
Web site: www.cts-forensics.com

Sex Estimation - Pelvic Morphology
Test No. 25-5511 Summary Report

Each participant received a sample pack consisting of digital scans of different pelvic bones. Participants were asked to estimate the sex of the remains and document methodology used. Data were returned from 25 participants and are compiled into the following tables:

This report contains the data received from the participants in this test. Since these participants are located in many countries around the world, and it is their option how the samples are to be used (e.g., training exercise, known or blind proficiency testing, research and development of new techniques, etc.), the results compiled in the Summary Report are not intended to be an overview of the quality of work performed in the profession and cannot be interpreted as such. The Summary Comments are included for the benefit of participants to assist with maintaining or enhancing the quality of their results. These comments are not intended to reflect the general state of the art within the profession.

Participant results are reported using a randomly assigned "WebCode". This code maintains participant's anonymity, provides linking of the various report sections, and will change with every report.

Manufacturer's Information

Each digital sample pack consisted of different pelvic bones in 3D scan format with supplemental images. Participants were asked to estimate the biological sex of the bones and document any methodology used.

SAMPLE PREPARATION: Pelvic bones were selected and scanned in 3D scan format. Photographs of several representative perspectives were chosen for each bone. The scans and photos were then zipped and uploaded to the CTS Portal. The digital upload was then checked to ensure all items were accessible.

VERIFICATION: Predistribution results were generally consistent with each other and with the manufacturer's preparation information. One laboratory reported a result that was not consistent for one of the four items. After an internal review of the results, the test was approved for release.

Item	Sex
1	Female
2	Male
3*	Male
4	Female

** A consensus was not achieved for Item 3. Please see the Summary Comments for more information.*

Summary Comments

This test was designed to allow participants to assess their proficiency in estimating the donor sex of pelvic remains. Participants were supplied with digital scans of different pelvic bones (Items 1 -4). Items 1 and 4 originated from a female donor. Items 2 and 3 originated from a male donor. Refer to the Manufacturer's Information for preparation details.

Data were returned by 25 participants.

For Item 1, all participants estimated the donor sex as Female. For Item 2, all but one participant estimated the donor sex as Male, with the remaining participant reporting Probable Female. For Item 3, a consensus was not achieved: six participants reported Female, six reported Probable Female, eight reported Male, two reported Probable Male, and three reported Inconclusive. The remains for this item originated from a 41-year-old Hispanic male. For Item 4, all participants estimated the donor sex as Female or Probable Female.

Examination Results For Item 1

What is the estimated sex of the innominate provided in the submitted 3D scan?

TABLE 1 - Item 1

		Methodology Used		
WebCode	Estimated Sex	MorphoPASSE	Klales, A.R., et al. (2012)	Other(s)
37TYGF	Female		✓	
3M2WZE	Female	✓		Buikstra and Ubelaker sciatic notch assessment
3T9KDF	Female		✓	
88RXJB	Female		✓	AEAOF RECOMMENDATIONS
994RYB	Female			J. BRUZEK 2002 ; R. STECKEL er al 2005.
9QHA7A	Female			Phenice, 1969; morphological traits (White and Folkens, 2005; Buikstra and Ubelaker, 1994)
A7ANH9	Female	✓		
B6TRQA	Female	✓		phenice 1969; buikstra and ubelaker 1994
CPYLX7	Female	✓		Buikstra and Ubelaker (1994), Walker (2005), Klales and Cole (2018)
ETT3M6	Female			Zhang Jizong, Cai Jifeng, Lai Jianghua. Forensic Anthropology[M]. 3rd ed. Beijing: People's Medical Publishing House, 2021,67-72.
FP3F62	Female	✓		
KH4KAX	Female	✓		
L3AEGV	Female		✓	
LKPNGV	Female	✓	✓	Additionally, the shape of the pubic bone (quadrangular for females vs. triangular for males), the shape of the sub-pubic area (concave for females vs. convex males) and the presence/absence of ventral arch (females vs. males) were evaluated when possible
LQD9MW	Female		✓	
MZ2JAW	Female			Phenice 1969; Buikstra & Ubelaker 1994
Q2Y4QT	Female		✓	
RB7ZAP	Female			Phenice
RTN26R	Female		✓	
VG3YBP	Female			Phenice 1969
VK3A7P	Female		✓	

TABLE 1 - Item 1

WebCode	Estimated Sex	Methodology Used		
		MorphoPASSE	Klales, A.R., et al. (2012)	Other(s)
VPTJGM	Female			Bruzek, « A method for visual determination of sex, using the human hip bone », AJPA 2002 Murail & al. « DSP: a tool for probabilistic sex diagnosis using worldwide variability in hip-bone measurements », BMSAP 2005
VXPEEL	Female	✓	✓	Greater Sciatic Notch (Buikstra & Ubelaker 1994)
W6H7ZK	Female			
XNBAGL	Female		✓	

Response Summary - Item 1

Participants: **25**

What is the estimated sex of the innominate provided in the submitted 3D scan?

Estimated Sex	Total Participants		MorphoPASSE	Klales, A.R., et al. (2012)	Other(s)
Female	**25**	(100%)	**8**	**11**	**13**
Probable Female	**0**	(0%)	**0**	**0**	**0**
Male	**0**	(0%)	**0**	**0**	**0**
Probable Male	**0**	(0%)	**0**	**0**	**0**
Inconclusive	**0**	(0%)	**0**	**0**	**0**

Examination Results For Item 2

What is the estimated sex of the innominate provided in the submitted 3D scan?

TABLE 1 - Item 2

WebCode	Estimated Sex	Methodology Used		
		MorphoPASSE	Klales, A.R., et al. (2012)	Other(s)
37TYGF	Probable Female		✓	
3M2WZE	Male	✓		Buikstra and Ubelaker sciatic notch assessment
3T9KDF	Male		✓	
88RXJB	Male		✓	AEAOF RECOMMENDATIONS
994RYB	Male			J. BRUZEK 2002 ; R. STECKEL er al 2005.
9QHA7A	Male			Phenice, 1969; morphological traits (White and Folkens, 2005; Buikstra and Ubelaker, 1994)
A7ANH9	Male	✓		
B6TRQA	Male	✓		phenice 1969; buikstra and ubelaker 1994
CPYLX7	Male	✓		Buikstra and Ubelaker (1994), Walker (2005), Klales and Cole (2018)
ETT3M6	Male			Zhang Jizong, Cai Jifeng, Lai Jianghua. Forensic Anthropology[M]. 3rd ed. Beijing: People's Medical Publishing House, 2021,67-72.
FP3F62	Male	✓		
KH4KAX	Male	✓		
L3AEGV	Male		✓	
LKPNGV	Male	✓	✓	Additionally, the shape of the pubic bone (quadrangular for females vs. triangular for males), the shape of the sub-pubic area (concave for females vs. convex males) and the presence/absence of ventral arch (females vs. males) were evaluated when possible
LQD9MW	Male		✓	
MZ2JAW	Male			Phenice 1969; Buikstra & Ubelaker 1994
Q2Y4QT	Male		✓	
RB7ZAP	Male			Phenice
RTN26R	Male		✓	
VG3YBP	Male			Phenice 1969
VK3A7P	Male		✓	

TABLE 1 - Item 2

WebCode	Estimated Sex	Methodology Used		
		MorphoPASSE	Klales, A.R., et al. (2012)	Other(s)
VPTJGM	Male			Bruzek, « A method for visual determination of sex, using the human hip bone », AJPA 2002 Murail & al. « DSP: a tool for probabilistic sex diagnosis using worldwide variability in hip-bone measurements », BMSAP 2005
VXPEEL	Male		✓	Greater Sciatic Notch (Buikstra & Ubelaker 1994)
W6H7ZK	Male			
XNBAGL	Male		✓	

Response Summary - Item 2

Participants: **25**

What is the estimated sex of the innominate provided in the submitted 3D scan?

Estimated Sex	Total Participants	MorphoPASSE	Klales, A.R., et al. (2012)	Other(s)
Female	**0** (0%)	**0**	**0**	**0**
Probable Female	**1** (4%)	**0**	**1**	**0**
Male	**24** (96%)	**7**	**10**	**13**
Probable Male	**0** (0%)	**0**	**0**	**0**
Inconclusive	**0** (0%)	**0**	**0**	**0**

Examination Results For Item 3

What is the estimated sex of the innominate provided in the submitted 3D scan?

TABLE 1 - Item 3

		Methodology Used		
WebCode	Estimated Sex	MorphoPASSE	Klales, A.R., et al. (2012)	Other(s)
37TYGF	Probable Female		✓	
3M2WZE	Probable Female	✓		Buikstra and Ubelaker sciatic notch assessment
3T9KDF	Female		✓	
88RXJB	Female		✓	AEAOF RECOMMENDATIONS
994RYB	Male			J. BRUZEK 2002 ; R. STECKEL er al 2005.
9QHA7A	Male			Phenice, 1969; morphological traits (White and Folkens, 2005; Buikstra and Ubelaker, 1994)
A7ANH9	Male	✓		
B6TRQA	Probable Female	✓		phenice 1969; buikstra and ubelaker 1994
CPYLX7	Probable Male	✓		Buikstra and Ubelaker (1994), Walker (2005), Klales and Cole (2018)
ETT3M6	Male			Zhang Jizong, Cai Jifeng, Lai Jianghua. Forensic Anthropology[M]. 3rd ed. Beijing: People's Medical Publishing House, 2021,67-72.
FP3F62	Male	✓		
KH4KAX	Male	✓		
L3AEGV	Inc		✓	
LKPNGV	Inc	✓	✓	Additionally, the shape of the pubic bone (quadrangular for females vs. triangular for males), the shape of the sub-pubic area (concave for females vs. convex males) and the presence/absence of ventral arch (females vs. males) were evaluated when possible
LQD9MW	Female		✓	
MZ2JAW	Male			Phenice 1969; Buikstra & Ubelaker 1994
Q2Y4QT	Female		✓	
RB7ZAP	Probable Female		✓	
RTN26R	Female		✓	
VG3YBP	Probable Female			Phenice 1969
VK3A7P	Female		✓	

TABLE 1 - Item 3

WebCode	Estimated Sex	Methodology Used		
		MorphoPASSE	Klales, A.R., et al. (2012)	Other(s)
VPTJGM	Inc			Bruzek, « A method for visual determination of sex, using the human hip bone », AJPA 2002 Murail & al. « DSP: a tool for probabilistic sex diagnosis using worldwide variability in hip-bone measurements », BMSAP 2005
VXPEEL	Probable Female	✓	✓	Greater Sciatic Notch (Buikstra & Ubelaker 1994)
W6H7ZK	Probable Male			
XNBAGL	Male		✓	

Response Summary - Item 3

Participants: **25**

What is the estimated sex of the innominate provided in the submitted 3D scan?

Estimated Sex	Total Participants	MorphoPASSE	Klales, A.R., et al. (2012)	Other(s)
Female	**6** (24%)	**0**	**6**	**1**
Probable Female	**6** (24%)	**3**	**3**	**4**
Male	**8** (32%)	**3**	**1**	**4**
Probable Male	**2** (8%)	**1**	**0**	**1**
Inconclusive	**3** (12%)	**1**	**2**	**2**

Examination Results For Item 4

What is the estimated sex of the innominate provided in the submitted 3D scan?

TABLE 1 - Item 4

		Methodology Used		
WebCode	Estimated Sex	MorphoPASSE	Klales, A.R., et al. (2012)	Other(s)
37TYGF	Probable Female		✓	
3M2WZE	Female	✓		Buikstra and Ubelaker sciatic notch assessment
3T9KDF	Female		✓	
88RXJB	Female		✓	AEAOF RECOMMENDATIONS
994RYB	Female			J. BRUZEK 2002 ; R. STECKEL er al 2005.
9QHA7A	Female			Phenice, 1969; morphological traits (White and Folkens, 2005; Buikstra and Ubelaker, 1994)
A7ANH9	Female	✓		
B6TRQA	Female	✓		phenice 1969; buikstra and ubelaker 1994
CPYLX7	Female	✓		Buikstra and Ubelaker (1994), Walker (2005), Klales and Cole (2018)
ETT3M6	Female			Zhang Jizong, Cai Jifeng, Lai Jianghua. Forensic Anthropology[M]. 3rd ed. Beijing: People's Medical Publishing House, 2021,67-72.
FP3F62	Female	✓		
KH4KAX	Female	✓		
L3AEGV	Female		✓	
LKPNGV	Probable Female	✓	✓	Additionally, the shape of the pubic bone (quadrangular for females vs. triangular for males), the shape of the sub-pubic area (concave for females vs. convex males) and the presence/absence of ventral arch (females vs. males) were evaluated when possible
LQD9MW	Female		✓	
MZ2JAW	Female			Phenice 1969; Buikstra & Ubelaker 1994
Q2Y4QT	Female		✓	
RB7ZAP	Probable Female			Phenice
RTN26R	Female		✓	
VG3YBP	Female			Phenice 1969
VK3A7P	Probable Female		✓	

TABLE 1 - Item 4

WebCode	Estimated Sex	Methodology Used: MorphoPASSE	Methodology Used: Klales, A.R., et al. (2012)	Methodology Used: Other(s)
VPTJGM	Female			Bruzek, « A method for visual determination of sex, using the human hip bone », AJPA 2002 Murail & al. « DSP: a tool for probabilistic sex diagnosis using worldwide variability in hip-bone measurements », BMSAP 2005
VXPEEL	Female	✓	✓	Greater Sciatic Notch (Buikstra & Ubelaker 1994)
W6H7ZK	Female			
XNBAGL	Female		✓	

Response Summary - Item 4

Participants: **25**

What is the estimated sex of the innominate provided in the submitted 3D scan?

Estimated Sex	Total Participants		MorphoPASSE	Klales, A.R., et al. (2012)	Other(s)
Female	**21**	(84%)	**7**	**8**	**11**
Probable Female	**4**	(16%)	**1**	**3**	**2**
Male	**0**	(0%)	**0**	**0**	**0**
Probable Male	**0**	(0%)	**0**	**0**	**0**
Inconclusive	**0**	(0%)	**0**	**0**	**0**

Additional Comments

TABLE 2

WebCode	Additional Comments
3M2WZE	Additional images of pelvic features were very helpful
9QHA7A	In the case of Item 3, the overall shape and bone proportions, as well as the degree of robustness, indicate a male. However, we observed certain morphological features that are ambiguous (greater sciatic notch, subpubic concavity) or even associated with females (ventral arc). Since the bone could only be assessed from digital material and without the rest of the skeleton (including the other innominate bone), the result could also be marked as "inconclusive."
B6TRQA	These are difficult to do electronically. Size, feel, and everything else matters.
ETT3M6	Item1.Female: The pubic symphysis is quasi-square, the inferior pubic angle is quasi-obtuse triangle, and the inferior pubic ramus is concave laterally; the greater sciatic notch is wide and shallow. Item2.Male: The pubic symphysis is triangular-like, the inferior pubic angle is acute-angled triangular, the inferior pubic ramus is straight; the greater sciatic notch is narrow and deep. Item3.Male: The pubic symphysis is triangular-like, the inferior pubic angle is acute-angled triangular, the inferior pubic ramus is straight; the greater ischial notch is narrow and deep. Item4.Female: The pubic symphysis is quasi-square, the inferior pubic angle is quasi-obtuse triangle, and the inferior pubic ramus is concave laterally; the greater sciatic notch is wide and shallow.
L3AEGV	Case 3 is marked as inconclusive as the traits fall in the middle on the scale (Klales) and other supporting non-metric traits do as well.
LKPNGV	ITEM 3 was established as inconclusive, as it presents some traits slightly indicating male and some traits slightly indicating female. Ventral arch: presence of a small triangular area (25-40°). Sub-pubic angle: straight, with a small indentation under the articular surface (cat 2). Sciatic notch: with an intermediate morphology (cat 3). Finally, it appears to have a single arch in relation to the auricular surface and the sciatic notch. We would like to indicate that, in a case like this the final sex determination would be established using metric data and applying techniques such as Bruzek et al. (2017). Regarding ITEM 4 it has been established as probably female, as the majority of traits such as the morphology of the sciatic notch and the presence of a wide ventral arch are indicative of female. However, we would like to indicate that the pubic angle corresponds to cat. 3 (straight sub-pubic region, with a small indentation under the articular surface).
VPTJGM	Methods : Bruzek, « A method for visual determination of sex, using the human hip bone », AJPA 2002. Murail & al. « DSP: a tool for probabilistic sex diagnosis using worldwide variability in hip-bone measurements », BMSAP 2005

-End of Report-
(Appendix may follow)

Collaborative Testing Services ~ Forensic Testing Program

Test No. 25-5511: Sex Estimation - Pelvic Morphology

DATA MUST BE SUBMITTED BY **Dec. 22, 2025, 11:59 p.m. EST** TO BE INCLUDED IN THE REPORT

Participant Code: U1234A WebCode: XUZRWH

The Accreditation Release section can be accessed by using the "Continue to Final Submission" button above. This information can be entered at any time prior to submitting to CTS.

Scenario:
Using the provided 3D scans, estimate the sex of each adult human innominate (pelvic bone) based on morphological characteristics. You may reference the supplemental images as needed to support your analysis. Treat each item as an independent case; do not assume any continuity across samples.

Download the .zip file below and open each item in Adobe Acrobat. You may need to enable 3D viewing for the scan. Click once on the bone to load the 3D tools, then rotate, adjust lighting, and change background settings as needed for analysis.

For each case (Items 1-4), complete the following:

1. Sex Estimation: Conduct a morphological assessment to estimate sex.

2. Methodology Documentation: Specify the method(s)/reference(s) utilized in each assessment.

3. Inconclusive Results: If a specimen cannot be confidently sexed, designate it as "Inconclusive" and provide an explanation in the Additional Comments section of the data sheet.

Items Submitted (Sample Pack SE):
Items 1-4: 3D scans with three supplemental images.
Supplemental Images Provided:
1: Ischiopubic Ramus: This is a medial view of the ischiopubic ramus.
2: Ventral Arc: This is an anterior view of the pubis.
3: Subpubic Contour: This is a posterior view of the pubis and ischium.

To verify a complete and accurate download, the hash value for the downloaded .ZIP file is as follows:
25-5511_Sex Estimation - Pelvic Morphology_DataForParticipants.zip MD5 hash value: da0eb652ba005d45122ccee36d8f9940
25-5511_Sex Estimation - Pelvic Morphology_DataForParticipants.zip SHA1 hash value:
68c244f29263d2645bff09637baeb11da3076472

1.) What is the estimated sex of the innominate provided in the submitted 3D scan (Items 1-4)?

Use the dropdown to select the estimated sex of each item. For "inconclusive" results, briefly explain in the Additional Comments. Use the check boxes to document any method(s)/reference(s) used to conduct analysis. Note: the sources provided is not an all-inclusive list and should not supersede methods required by your agency. To document any sources not provided, use the "Other" text box.

Item 1
Estimated Sex:

Method(s)/Reference(s) Used:

- ☐ MorphoPASSE
- ☐ Klales AR., et al. 2012
- Other(s)

Item 2
Estimated Sex:

Method(s)/Reference(s) Used:

- ☐ MorphoPASSE
- ☐ Klales AR., et al. 2012
- Other(s)

Item 3
Estimated Sex:

Method(s)/Reference(s) Used:

- ☐ MorphoPASSE
- ☐ Klales AR., et al. 2012
- Other(s)

Item 4
Estimated Sex:

Method(s)/Reference(s) Used:

- ☐ MorphoPASSE
- ☐ Klales AR., et al. 2012
- Other(s)

*Should an item(s) be marked "Inconclusive", please document the reason in the Additional Comments section of this data sheet.

2.) Additional Comments

Note: *Please use appropriate punctuation to indicate the end of sentences, sections, and statements in the free-form space below. Extra spacing and returns used for separation within your text will not transfer and may cause your information to be illegible in the Summary Report. The use of lists and tabular formats to deliver information is also cautioned against, as these do not transfer.*

RELEASE OF DATA TO ACCREDITATION BODIES

The Accreditation Release is accessed by pressing the "Continue to Final Submission" button online and can be completed at any time prior to submission to CTS.

CTS submits external proficiency test data directly to ANAB and/or A2LA. Please select one of the following statements to ensure your data is handled appropriately.

- ○ This participant's data is intended for submission to ANAB and/or A2LA. (Accreditation Release section below must be completed.)
- ○ This participant's data is **not** intended for submission to ANAB and/or A2LA.

Have the laboratory's designated individual complete the following steps
only if your laboratory is accredited in this testing/calibration discipline
by one or more of the following Accreditation Bodies.

Step 1: Provide the applicable Accreditation Certificate Number(s) for your laboratory

ANAB Certificate No.

A2LA Certificate No.

Step 2: Complete the Laboratory Identifying Information in its entirety

Authorized Contact Person and Title

Laboratory Name

Location (City/State)