



BOURNEMOUTH UNIVERSITY

**An initial evaluation of the relationship between human pelvic size
and shape and the distribution, type and severity of vertebral
degenerative disease in archaeological material**

(VOLUME 2)

Linda Ellen O'Connell

PhD

2004

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**A An initial evaluation of the relationship between human pelvic
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(VOLUME 2)

Linda Ellen O'Connell

**A thesis submitted in partial fulfilment of the requirements of
Bournemouth University for the degree of Doctor of Philosophy**

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Bournemouth University

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Appendix 1

Management strategies for osteoarthritis

Management strategies for osteoarthritis

The ultimate goal of any form of management is to reduce pain and disability (Collier *et al.*, 1991; Lozada and Altman, 1997) and minimise the progress of the condition.

Treatment available basically falls into one of four categories: a) general; b) physical; c) pharmacological and d) surgical.

General measures include activities such as weight reduction in obese patients (Collier *et al.*, 1991; Dickson and Wright, 1984; Dieppe, 1990; Doherty *et al.*, 1998; Felson *et al.*, 1992; Hope *et al.*, 1989; Rubenstein and Wayne, 1991).

Physical management incorporates simple procedures such as the application of thermal modalities. These include application of superficial heat, such as hot packs, radiant heat, hydrotherapy, fluidotherapy and paraffin bathing (Cordray and Krusen, 1959; Fontain *et al.*, 1960), in addition to more deeper ultrasonographic heat transfer (Fontain *et al.*, 1960; Lehman *et al.*, 1958). Temperatures of 40-45°C are usually applied for between three to 30 minutes (Lozada and Altman, 1997). Cold applications, such as cold packs and vapocoolant sprays are also beneficial (Swezey, 1974).

Physiotherapy also plays a major role in management and consists of active (isotonic, isometric and isokinetic) and passive exercise (Altman *et al.*, 2000; Deyle, 2000; Dieppe, 1990; Ettinger *et al.*, 1997; Fisher *et al.*, 1991, 1993; Hochberg *et al.*, 1995a, b; Kline Mangione *et al.*, 1999; Kovar *et al.*, 1992; Marks, 1993; Maurer *et al.*, 1999; Minor *et al.*, 1989; O'Reilly *et al.*, 1998, 1999; Røgind *et al.*, 1998; van Baar *et al.*, 2001).

Occupational therapy can assist with the tasks of daily living (Collier *et al.*, 1991; Dieppe, 1990; Doherty *et al.*, 1998) and advising on available aids. The latter may incorporate orthotics and support devices, such as canes (Blount, 1956; Brand and Crowninshield, 1980), crutches, corsets, collars, knee braces (Rubin *et al.*, 1977), support bandages (Barrett *et al.*, 1991; Hassan *et al.*, 2002), orthotics for shoes (Keating *et al.*, 1993; Liang and Fortin, 1991; Thompson *et al.*, 1992) and medial taping of the patella (Cushnagan *et al.*, 1988).

Pharmacological agents include non steroidal anti-inflammatory drugs (NSAIDs), which may be administered systemically (Bradley *et al.*, 1991; Mazzuca *et al.*, 1991; McAlindon and Dieppe, 1990) and topically (Dreiser and Tisne-Camus, 1993). Non-anti-inflammatory analgesic agents, once again employed both in a systemic and topical manner (Bradley *et al.*, 1991; Deal *et al.*, 1991; Detora *et al.*, 2001; McCarthy and McCarthy, 1992), may also help to alleviate symptoms. The use of intra-articular depocorticosteroids (Dieppe *et al.*,

1980; Fast, 1988; Miller *et al.*, 1958) have received a somewhat mixed review. Although considered effective in the treatment of osteoarthritis by some authors, this approach is considered, at best, as short term or modest (Brandt and Bradley, 2001; Gaffney *et al.*, 1995), or at worst, as questionable therapy, by others. Accurate placement of injections, however, is a known factor in improving patient outcome (Eustace *et al.*, 1997; Jones *et al.*, 1993). Although muscle spasm is mainly managed through the physical modalities previously considered, antispasmodics may also prove beneficial if administered, either in combination with, or without, a depocorticosteroid (Lozada and Altman, 1997). Other long-acting forms of symptomatic therapy and disease modifying agents are also available, but their use is still under evaluation and appears to have variable onsets of benefits, with none yet being established as effective therapies. The use of leeches (*Hirudo Medicinalis*) has also been the subject of a recent pilot study (Michalsen *et al.*, 2001) and has produced promising results that require further investigation.

Surgical management involves a number of procedures. The main reason for undertaking these surgical treatments is intractable pain, although the need to restore a functionally compromised joint follows a close second. Arthrodesis (Dickson and Wright, 1984; Hope *et al.*, 1989; Kumar and Clark, 1987; Rubenstein and Wayne, 1991) is the surgical fusion of a joint by a procedure designed to accomplish fusion of the joint surfaces by promoting the proliferation of bone cells (Dorland, 200) and will be performed either to relieve pain in a severely diseased joint or to stabilize the structure. Osteotomy (Collier *et al.*, 1991; Dieppe, 1990) is another procedure and involves the surgical cutting of bone (Dorland, 2000; Spraycar, 1995). It can be employed to relieve pain and correct deformities and may provide an alternative to arthroplasty in uni-compartmental disease of the knee and in younger, overweight patients (Lozada and Altman, 1997). A more radical approach is arthroplasty – excisional or interposition (Collier *et al.*, 1991; Dickson and Wright, 1984; Rubenstein and Wayne, 1991). This describes the creation of an artificial joint to correct ankylosis, and is an operative procedure undertaken to restore, as far as possible, the integrity and functional power of a joint (Spraycar, 1995). Synovectomy (the surgical removal of the synovium or synovial membrane of a joint [Macpherson, 1999; Spraycar, 1995]) and debridement (the excision of devitalized tissue and foreign material from a wound [Macpherson, 1999; Spraycar, 1995]) are other procedures that may be implemented, but their role in effective treatment of osteoarthritis joints has not been clearly defined at present.

Currently modern tissue engineering strategies offer an alternative to the surgical approach by effectively repairing joint surface defects biologically (Luyten, 1997). Chondrocyte cells are obtained from cartilage biopsies undertaken in areas of minor weight transference in a joint. These cells are then expanded *in vitro* and can be utilised for autologous chondrocyte transplantation (Brittberg *et al.*, 1994; Peterson, 2000). The cells are injected into joint surface defects and secured under a periosteal flap (Brittberg *et al.*, 1994). Dell'Accio *et al.* (2001) established an assay which could assess the capacity of adult human articular chondrocytes to form stable cartilage *in vivo*, and which would subsequently be resistant to vascular invasion, dystrophic calcification and bone formation.

Appendix 2

Recording sheets employed for data collection

(Layout has been altered to fit within margin restrictions)

COLLECTION: _____ BURIAL: _____

Burial	
Preservation	
Type of Burial	
Period of interment (date of)	
Sex	
Age	
Parity status	

Sacral Measurement (mm) or degrees	
Maximum superior sacral width	
Maximum inferior sacral width	
Maximum transverse diameter of S1	
Maximum antero-posterior diameter of S1	
Height of body of first sacral vertebra	
Promontorium angle	
Mid-ventral curved length	
Distance of medial borders of articular surfaces of processus articularres superiores	
Distance of lateral borders of articular surfaces of processus articularres superiores	
Spinal canal maximum transverse width	
Spinal canal maximum antero-posterior width	
Combined transverse width of ala	
Profiling of sacrum	
Anterior mid ventral straight height	
Maximum depth of curvature (Sacral depth)	

Innominate Measurement (mm) or degrees	L	R
Maximum innominate length		
Innominate breadth		
Iliac height		
Acetabulum diameter		
Pubis length		
Minimum height of inferior pubic ramus		
Oblique length of inferior pubic ramus		
Tubercolusymphyseal height		
Pubic acetabular length		
Pubic tubercle-acetabular length		
Ischial acetabular height		
Pubo-sacroiliac diameter		
Pubic symphysis depth		
Pubic symphysis superior width		
Pubic symphysis inferior width		
Maximum width of pubic symphysis		
Ischial spine to symphysion		
Symphyseal angle		
Acetabulosciatic breadth		
Ischium length		
Maximum length of obturator foramen		
Maximum width of obturator foramen		

Profiling of auricular surface		L	R
Measurements taken:	a		
	b		
	c		
	d		
	e		
	f		
Profiling sciatic notch			
Sciatic notch width			
Sciatic notch height			
Sciatic notch position (from ischial spine)			
Sciatic notch angle:	1 (Smaller)		
	2 (Larger)		

Articulated Pelvis Measurement (mm) or degrees	
Shape	
Antero-posterior superior diameter of the pelvis	
Antero-posterior inferior diameter of the pelvis	
Transverse diameter of the pelvis	
Greatest pelvic diameter	
Bispinous breadth	
Bi-tuberos diameter (between ischio-acetabular pts)	
Bi-tuberos width (most superior, posterior aspect)	
Right ischial spine to sacral apex	
Left ischial spine to sacral apex	
Right ischial tuberosity to sacral apex	
Left ischial tuberosity to sacral apex	
Subpubic angle	
Inlet circumference	
Superior-anterior bi-iliac breadth of pelvis	
Inferior-posterior bi-iliac breadth of pelvis	
Bi-acetabular breadth	

Antero-posterior superior diameter of the pelvis	L	
	R	
Antero-posterior inferior diameter of the pelvis	L	
	R	
Greatest pelvic diameter	L	
	R	
Inlet circumference		

Femur lengths (cms)

L

R

BURIAL IDENTIFICATION: _____

VERTEBRA: Occipital condyles

☐ Present ☐ Absent

	Occipital Condyle	
	Left	Right
Osteophytosis and Osteoarthritis		
Osteophytes		
Extent of circumference affected by lipping		
Degree of surface porosity		
Extent of surface affected by porosity		
Degree of eburnation		
Extent of surface affected by eburnation		

VERTEBRA: S1 (Superior surface and articular facets)

☐ Present ☐ Absent

	Vertebral body Superior surface	Articular facets	
		Left superior	Right superior
Osteophytosis and Osteoarthritis			
Osteophytes			
Extent of circumference affected by lipping			
Degree of surface porosity			
Extent of surface affected by porosity			
Degree of eburnation			
Extent of surface affected by eburnation			

BURIAL IDENTIFICATION: _____

VERTEBRA: C1 (Atlas) ☐ Present ☐ Absent

	Facet for dens of axis	Articular facets			
		Left superior	Right superior	Left inferior	Right inferior
Osteophytosis and Osteoarthritis					
Osteophytes					
Extent of circumference affected by lipping					
Degree of surface porosity					
Extent of surface affected by porosity					
Degree of eburnation					
Extent of surface affected by eburnation					

VERTEBRA: C2 (Axis) ☐ Present ☐ Absent

	Vertebral body Inferior surface	Odontoid peg	Articular facets			
			Left superior	Right superior	Left inferior	Right inferior
Osteophytosis and Osteoarthritis						
Osteophytes						
Extent of circumference affected by lipping						
Degree of surface porosity						
Extent of surface affected by porosity						
Degree of eburnation						
Extent of surface affected by eburnation						

BURIAL IDENTIFICATION: _____

VERTEBRA: C3 ☐ Present ☐ Absent

Osteophytosis and Osteoarthritis Osteophytes Extent of circumference affected by lipping Degree of surface porosity Extent of surface affected by porosity Degree of eburnation Extent of surface affected by eburnation	Vertebral body		Articular facets			
	Superior surface	Inferior surface	Left superior	Right superior	Left inferior	Right inferior

VERTEBRA: C4 ☐ Present ☐ Absent

Osteophytosis and Osteoarthritis Osteophytes Extent of circumference affected by lipping Degree of surface porosity Extent of surface affected by porosity Degree of eburnation Extent of surface affected by eburnation	Vertebral body		Articular facets			
	Superior surface	Inferior surface	Left superior	Right superior	Left inferior	Right inferior

BURIAL IDENTIFICATION: _____

VERTEBRA: C5 ☐ Present ☐ Absent

	Vertebral body		Articular facets			
	Superior surface	Inferior surface	Left superior	Right superior	Left inferior	Right inferior
Osteophytosis and Osteoarthritis						
Osteophytes						
Extent of circumference affected by lipping						
Degree of surface porosity						
Extent of surface affected by porosity						
Degree of eburnation						
Extent of surface affected by eburnation						

VERTEBRA: C6 ☐ Present ☐ Absent

	Vertebral body		Articular facets			
	Superior surface	Inferior surface	Left superior	Right superior	Left inferior	Right inferior
Osteophytosis and Osteoarthritis						
Osteophytes						
Extent of circumference affected by lipping						
Degree of surface porosity						
Extent of surface affected by porosity						
Degree of eburnation						
Extent of surface affected by eburnation						

BURIAL IDENTIFICATION: _____

VERTEBRA: C7 ☐ Present ☐ Absent

	Vertebral body		Articular facets			
	Superior surface	Inferior surface	Left superior	Right superior	Left inferior	Right inferior
Osteophytosis and Osteoarthritis						
Osteophytes						
Extent of circumference affected by lipping						
Degree of surface porosity						
Extent of surface affected by porosity						
Degree of eburnation						
Extent of surface affected by eburnation						

VERTEBRA: T1 ☐ Present ☐ Absent

	Vertebral body			Articular facets				Costal facets		Transverse process	
	Superior surface	Inferior surface		Left superior	Right superior	Left inferior	Right inferior	Left superior	Right superior	Left inferior	Right inferior
Osteophytosis and Osteoarthritis											
Osteophytes											
Extent of circumference affected by lipping											
Degree of surface porosity											
Extent of surface affected by porosity											
Degree of eburnation											
Extent of surface affected by eburnation											

BURIAL IDENTIFICATION: _____

VERTEBRA: T2 ☐ Present ☐ Absent

	Vertebral body		Articular facets				Costal facets				Transverse process	
	Superior surface	Inferior surface	Left superior	Right superior	Left inferior	Right inferior	Left superior	Right superior	Left inferior	Right inferior	Left	Right
Osteophytosis and Osteoarthritis												
Osteophytes												
Extent of circumference affected by lipping												
Degree of surface porosity												
Extent of surface affected by porosity												
Degree of eburnation												
Extent of surface affected by eburnation												

VERTEBRA: T3 ☐ Present ☐ Absent

	Vertebral body		Articular facets				Costal facets				Transverse process	
	Superior surface	Inferior surface	Left superior	Right superior	Left inferior	Right inferior	Left superior	Right superior	Left inferior	Right inferior	Left	Right
Osteophytosis and Osteoarthritis												
Osteophytes												
Extent of circumference affected by lipping												
Degree of surface porosity												
Extent of surface affected by porosity												
Degree of eburnation												
Extent of surface affected by eburnation												

BURIAL IDENTIFICATION: _____

VERTEBRA: T4 ☐ Present ☐ Absent

	Vertebral body		Articular facets				Costal facets				Transverse process	
	Superior surface	Inferior surface	Left superior	Right superior	Left inferior	Right inferior	Left superior	Right superior	Left inferior	Right inferior	Left	Right
Osteophytosis and Osteoarthritis												
Osteophytes												
Extent of circumference affected by lipping												
Degree of surface porosity												
Extent of surface affected by porosity												
Degree of eburnation												
Extent of surface affected by eburnation												

VERTEBRA: T5 ☐ Present ☐ Absent

	Vertebral body		Articular facets				Costal facets				Transverse process	
	Superior surface	Inferior surface	Left superior	Right superior	Left inferior	Right inferior	Left superior	Right superior	Left inferior	Right inferior	Left	Right
Osteophytosis and Osteoarthritis												
Osteophytes												
Extent of circumference affected by lipping												
Degree of surface porosity												
Extent of surface affected by porosity												
Degree of eburnation												
Extent of surface affected by eburnation												

BURIAL IDENTIFICATION: _____

VERTEBRA: T6

☐ Present

☐ Absent

	Vertebral body		Articular facets				Costal facets				Transverse process	
	Superior surface	Inferior surface	Left superior	Right superior	Left inferior	Right inferior	Left superior	Right superior	Left inferior	Right inferior	Left	Right
Osteophytosis and Osteoarthritis												
Osteophytes												
Extent of circumference affected by lipping												
Degree of surface porosity												
Extent of surface affected by porosity												
Degree of eburnation												
Extent of surface affected by eburnation												

VERTEBRA: T7

☐ Present

☐ Absent

	Vertebral body		Articular facets				Costal facets				Transverse process	
	Superior surface	Inferior surface	Left superior	Right superior	Left inferior	Right inferior	Left superior	Right superior	Left inferior	Right inferior	Left	Right
Osteophytosis and Osteoarthritis												
Osteophytes												
Extent of circumference affected by lipping												
Degree of surface porosity												
Extent of surface affected by porosity												
Degree of eburnation												
Extent of surface affected by eburnation												

BURIAL IDENTIFICATION: _____

VERTEBRA: T8

☐ Present

☐ Absent

	Vertebral body		Articular facets				Costal facets				Transverse process	
	Superior surface	Inferior surface	Left superior	Right superior	Left inferior	Right inferior	Left superior	Right superior	Left inferior	Right inferior	Left	Right
Osteophytosis and Osteoarthritis												
Osteophytes												
Extent of circumference affected by lipping												
Degree of surface porosity												
Extent of surface affected by porosity												
Degree of eburnation												
Extent of surface affected by eburnation												

VERTEBRA: T9

☐ Present

☐ Absent

	Vertebral body		Articular facets				Costal facets				Transverse process	
	Superior surface	Inferior surface	Left superior	Right superior	Left inferior	Right inferior	Left superior	Right superior	Left inferior	Right inferior	Left	Right
Osteophytosis and Osteoarthritis												
Osteophytes												
Extent of circumference affected by lipping												
Degree of surface porosity												
Extent of surface affected by porosity												
Degree of eburnation												
Extent of surface affected by eburnation												

BURIAL IDENTIFICATION: _____

VERTEBRA: T10 ☐ Present ☐ Absent

	Vertebral body		Articular facets				Costal facets				Transverse process	
	Superior surface	Inferior surface	Left superior	Right superior	Left inferior	Right inferior	Left superior	Right superior	Left inferior	Right inferior	Left	Right
Osteophytosis and Osteoarthritis												
Osteophytes												
Extent of circumference affected by lipping												
Degree of surface porosity												
Extent of surface affected by porosity												
Degree of eburnation												
Extent of surface affected by eburnation												

VERTEBRA: T11 ☐ Present ☐ Absent

	Vertebral body		Articular facets				Costal facets	
	Superior surface	Inferior surface	Left superior	Right superior	Left inferior	Right inferior	Left	Right
Osteophytosis and Osteoarthritis								
Osteophytes								
Extent of circumference affected by lipping								
Degree of surface porosity								
Extent of surface affected by porosity								
Degree of eburnation								
Extent of surface affected by eburnation								

BURIAL IDENTIFICATION: _____

VERTEBRA: T12

☐ Present

☐ Absent

	Vertebral body		Articular facets				Costal facets	
	Superior surface	Inferior surface	Left superior	Right superior	Left inferior	Right inferior	Left	Right
Osteophytosis and Osteoarthritis								
Osteophytes								
Extent of circumference affected by lipping								
Degree of surface porosity								
Extent of surface affected by porosity								
Degree of eburnation								
Extent of surface affected by eburnation								

VERTEBRA: L1

☐ Present

☐ Absent

	Vertebral body		Articular facets			
	Superior surface	Inferior surface	Left superior	Right superior	Left inferior	Right inferior
Osteophytosis and Osteoarthritis						
Osteophytes						
Extent of circumference affected by lipping						
Degree of surface porosity						
Extent of surface affected by porosity						
Degree of eburnation						
Extent of surface affected by eburnation						

BURIAL IDENTIFICATION: _____

VERTEBRA: L2

☐ Present

☐ Absent

	Vertebral body		Articular facets			
	Superior surface	Inferior surface	Left superior	Right superior	Left inferior	Right inferior
Osteophytosis and Osteoarthritis						
Osteophytes						
Extent of circumference affected by lipping						
Degree of surface porosity						
Extent of surface affected by porosity						
Degree of eburnation						
Extent of surface affected by eburnation						

VERTEBRA: L3

☐ Present

☐ Absent

	Vertebral body		Articular facets			
	Superior surface	Inferior surface	Left superior	Right superior	Left inferior	Right inferior
Osteophytosis and Osteoarthritis						
Osteophytes						
Extent of circumference affected by lipping						
Degree of surface porosity						
Extent of surface affected by porosity						
Degree of eburnation						
Extent of surface affected by eburnation						

BURIAL IDENTIFICATION: _____

VERTEBRA: L4

☐ Present

☐ Absent

Osteophytosis and Osteoarthritis	Vertebral body		Articular facets			
	Superior surface	Inferior surface	Left superior	Right superior	Left inferior	Right inferior
Osteophytes						
Extent of circumference affected by lipping						
Degree of surface porosity						
Extent of surface affected by porosity						
Degree of eburnation						
Extent of surface affected by eburnation						

VERTEBRA: L5

☐ Present

☐ Absent

Osteophytosis and Osteoarthritis	Vertebral body		Articular facets			
	Superior surface	Inferior surface	Left superior	Right superior	Left inferior	Right inferior
Osteophytes						
Extent of circumference affected by lipping						
Degree of surface porosity						
Extent of surface affected by porosity						
Degree of eburnation						
Extent of surface affected by eburnation						

Appendix 3

Codes used for variables in SPSS data editor

KEY TO CODES EMPLOYED FOR VARIABLES IN SPSS DATA EDITOR

1) General data

Variable	Description
S1_A	Burial
S1_B	Type of burial
S1_C	Period of interment
S1_D	Sex
S1_E	Age
S1_F	Parity staus

2) Sacral measurements

Variable	Description
S1_G	Maximum superior sacral width
S1_H	Maximum inferior sacral width
S1_I	Maximum transverse diameter of S1
S1_J	Maximum A-P diameter of S1
S1_K	Height of body of 1st sacral vertebra
S1_L	Promontorium angle
S1_M	Mid-ventral curved length (cm)
S1_N	Distance of medial borders of processus articularres superiores
S1_O	Distance of lateral borders of processus articularres superiores
S1_P	Spinal canal maximum transverse width
S1_Q	Spinal canal maximum A-P width
S1_R	Combined transverse width of alae
S1_S	Anterior mid ventral straight height of sacrum
S1_T	Maximum depth of curvature of sacrum
S1_U	Position of maximum depth of curvature of sacrum

3) Innominate measurements

Variable	Description
S1_V	LEFT Maximum innominate length (cm)
S1_W	RIGHT Maximum innominate length (cm)
S1_X	LEFT Innominate breadth (cm)
S1_Y	RIGHT Innominate breadth (cm)
S1_Z	LEFT Iliac height
S1_AA	RIGHT Iliac height
S1_AB	LEFT Acetabulum diameter
S1_AC	RIGHT Acetabulum diameter
S1_AD	LEFT Pubis length
S1_AE	RIGHT Pubis length
S1_AF	LEFT Minimum height of inferior pubic ramus
S1_AG	RIGHT Minimum height of inferior pubic ramus
S1_AH	LEFT Oblique length of inferior pubic ramus
S1_AI	RIGHT Oblique length of inferior pubic ramus

Innominate measurements (contd.)

Variable	Description
S1_AJ	LEFT Tubercolusymphyseal height
S1_AK	RIGHT Tubercolusymphyseal height
S1_AL	LEFT Pubic acetabular length
S1_AM	RIGHT Pubic acetabular length
S1_AN	LEFT Pubic tubercle-acetabular length
S1_AO	RIGHT Pubic tubercle-acetabular length
S1_AP	LEFT Ischial acetabular height
S1_AQ	RIGHT Ischial acetabular height
S1_AR	LEFT Pubo-sacroiliac diameter
S1_AS	RIGHT Pubo-sacroiliac diameter
S1_AT	LEFT Pubic symphysis depth
S1_AU	RIGHT Pubic symphysis depth
S1_AV	LEFT Pubic symphysis superior width
S1_AW	RIGHT Pubic symphysis superior width
S1_AX	LEFT Pubic symphysis inferior width
S1_AY	RIGHT Pubic symphysis inferior width
S1_AZ	LEFT Maximum width of pubic symphysis
S1_BA	RIGHT Maximum width of pubic symphysis
S1_BB	LEFT Ischial spine to symphysis
S1_BC	RIGHT Ischial spine to symphysis
S1_BD	LEFT Symphyseal angle
S1_BE	RIGHT Symphyseal angle
S1_BF	LEFT Acetabulosciatic breadth
S1_BG	RIGHT Acetabulosciatic breadth
S1_BH	LEFT Ischium length
S1_BI	RIGHT Ischium length
S1_BJ	LEFT Maximum length of obturator foramen
S1_BK	RIGHT Maximum length of obturator foramen
S1_BL	LEFT Maximum width of obturator foramen
S1_BM	RIGHT Maximum width of obturator foramen
S1_BN	LEFT Auricular surface profile - a
S1_BO	RIGHT Auricular surface profile - a
S1_BP	LEFT Auricular surface profile - b
S1_BQ	RIGHT Auricular surface profile - b
S1_BR	LEFT Auricular surface profile - c
S1_BS	RIGHT Auricular surface profile - c
S1_BT	LEFT Auricular surface profile - d
S1_BU	RIGHT Auricular surface profile - d
S1_BV	LEFT Auricular surface profile - e
S1_BW	RIGHT Auricular surface profile - e
S1_BX	LEFT Auricular surface profile - f
S1_BY	RIGHT Auricular surface profile - f
S1_BZ	LEFT Sciatic notch width
S1_CA	RIGHT Sciatic notch width
S1_CB	LEFT Sciatic notch height
S1_CC	RIGHT Sciatic notch height
S1_CD	LEFT Sciatic notch position
S1_CE	RIGHT Sciatic notch position

4) Reconstructed pelvis measurements and shape

Variable	Description
S1_CF	A-P superior diameter of pelvis
S1_CG	A-P inferior diameter of pelvis
S1_CH	Transverse diameter of pelvis
S1_CI	Greatest pelvic diameter
S1_CJ	Bispinous breadth
S1_CK	Bi-tuberous diameter
S1_CL	Bi-tuberous width (cm)
S1_CM	Right ischial spine to sacral apex
S1_CN	Left ischial spine to sacral apex
S1_CO	Right ischial tuberosity to sacral apex
S1_CP	Left ischial tuberosity to sacral apex
S1_CQ	Subpubic angle
S1_CR	Inlet circumference (cm)
S1_CS	Superior-anterior bi-iliac breadth of pelvis (cm)
S1_CT	Inferior-posterior bi-iliac breadth of pelvis
S1_CU	Bi-acetabular breadth
S1_CV	Pelvic Shape

5) Femur length

Variable	Description
S2_FQ	LEFT Femur length (cm)
S2_FR	RIGHT Femur length (cm)

6) Cervical vertebrae – degenerative change

Variable	Description
S3_C	Atlas status
S3_D	Dens facet - osteophytes
S3_E	Dens facet - extent of osteophytes
S3_F	Dens facet - Porosity
S3_G	Dens facet - extent of porosity
S3_H	Dens facet - Eburnation
S3_I	Dens facet -extent of eburnation
S3_J	L superior AF-osteophytes
S3_K	L superior articular facet - extent of osteophytes
S3_L	L superior articular facet - porosity
S3_M	L superior articular facet - extent of porosity
S3_N	L superior articular facet - eburnation
S3_O	L superior articular facet - extent of eburnation
S3_P	R superior AF- osteophytes
S3_Q	R superior articular facet - extent of osteophytes
S3_R	R superior articular facet - porosity
S3_S	R superior articular facet - extent of porosity
S3_T	R superior articular facet - eburnation
S3_U	R superior articular facet - extent of eburnation

Cervical vertebrae – degenerative change (contd.)

Variable	Description
S3 V	L inferior articular facet -osteophytes
S3 W	L inferior articular facet - extent of osteophytes
S3 X	L inferior articular facet - porosity
S3 Y	L inferior articular facet - extent of porosity
S3 Z	L inferior articular facet - eburnation
S3 AA	L inferior articular facet - extent of eburnation
S3 AB	R inferior articular facet-osteophytes
S3 AC	R inferior articular facet - extent of osteophytes
S3 AD	R inferior articular facet - porosity
S3 AE	R inferior articular facet - extent of porosity
S3 AF	R inferior articular facet - eburnation
S3 AG	R inferior articular facet - extent of eburnation
S3 AH	Axis status
S3 AI	Axis body inferior surface - osteophytes
S3 AJ	Axis body inferior surface - extent of osteophytes
S3 AK	Axis body inferior surface - Porosity
S3 AL	Axis body inferior surface - extent of porosity
S3 AM	Axis body inferior surface - Eburnation
S3 AN	Axis body inferior surface - extent of eburnation
S3 AO	Odontoid peg - osteophytes
S3 AP	Odontoid peg - extent of osteophytes
S3 AQ	Odontoid peg - Porosity
S3 AR	Odontoid peg - extent of porosity
S3 AS	Odontoid peg - Eburnation
S3 AT	Odontoid peg - extent of eburnation
S3 AU	Axis L superior AF-osteophytes
S3 AV	Axis L superior articular facet - extent of osteophytes
S3 AW	Axis L superior articular facet - porosity
S3 AX	Axis L superior articular facet - extent of porosity
S3 AY	Axis L superior articular facet - eburnation
S3 AZ	Axis L superior articular facet - extent of eburnation
S3 BA	Axis R superior AF-osteophytes
S3 BB	Axis R superior articular facet - extent of osteophytes
S3 BC	Axis R superior articular facet - porosity
S3 BD	Axis R superior articular facet - extent of porosity
S3 BE	Axis R superior articular facet - eburnation
S3 BF	Axis R superior articular facet - extent of eburnation
S3 BG	Axis L inferior articular facet -osteophytes
S3 BH	Axis L inferior articular facet - extent of osteophytes
S3 BI	Axis L inferior articular facet - porosity
S3 BJ	Axis L inferior articular facet - extent of porosity
S3 BK	Axis L inferior articular facet - eburnation
S3 BL	Axis L inferior articular facet - extent of eburnation
S3 BM	Axis R inferior articular facet - osteophytes
S3 BN	Axis R inferior articular facet - extent of osteophytes
S3 BO	Axis R inferior articular facet - porosity
S3 BP	Axis R inferior articular facet - extent of porosity
S3 BQ	Axis R inferior articular facet - eburnation
S3 BR	Axis R inferior articular facet - extent of eburnation

Cervical vertebrae – degenerative change (contd.)

Variable	Description
S3_BS	C3 status
S3_BT	C3 body superior surface - osteophytes
S3_BU	C3 body superior surface - extent of osteophytes
S3_BV	C3 body superior surface - Porosity
S3_BW	C3 body superior surface - extent of porosity
S3_BX	C3 body superior surface - Eburnation
S3_BY	C3 body superior surface - extent of eburnation
S3_BZ	C3 body inferior surface - osteophytes
S3_CA	C3 body inferior surface - extent of osteophytes
S3_CB	C3 body inferior surface - Porosity
S3_CC	C3 body inferior surface - extent of porosity
S3_CD	C3 body inferior surface - Eburnation
S3_CE	C3 body inferior surface - extent of eburnation
S3_CF	C3 L superior AF- osteophytes
S3_CG	C3 L superior articular facet - extent of osteophytes
S3_CH	C3 L superior articular facet - porosity
S3_CI	C3 L superior articular facet - extent of porosity
S3_CJ	C3 L superior articular facet - eburnation
S3_CK	C3 L superior articular facet - extent of eburnation
S3_CL	C3 R superior AF-osteophytes
S3_CM	C3 R superior articular facet - extent of osteophytes
S3_CN	C3 R superior articular facet - porosity
S3_CO	C3 R superior articular facet - extent of porosity
S3_CP	C3 R superior articular facet - eburnation
S3_CQ	C3 R superior articular facet - extent of eburnation
S3_CR	C3 L inferior articular facet - osteophytes
S3_CS	C3 L inferior articular facet - extent of osteophytes
S3_CT	C3 L inferior articular facet - porosity
S3_CU	C3 L inferior articular facet - extent of porosity
S3_CV	C3 L inferior articular facet - eburnation
S3_CW	C3 L inferior articular facet - extent of eburnation
S3_CX	C3 R inferior articular facet - osteophytes
S3_CY	C3 R inferior articular facet - extent of osteophytes
S3_CZ	C3 R inferior articular facet - porosity
S3_DA	C3 R inferior articular facet - extent of porosity
S3_DB	C3 R inferior articular facet - eburnation
S3_DC	C3 R inferior articular facet - extent of eburnation
S3_DD	C4 status
S3_DE	C4 body superior surface - osteophytes
S3_DF	C4 body superior surface - extent of osteophytes
S3_DG	C4 body superior surface - Porosity
S3_DH	C4 body superior surface - extent of porosity
S3_DI	C4 body superior surface - Eburnation
S3_DJ	C4 body superior surface - extent of eburnation
S3_DK	C4 body inferior surface - osteophytes
S3_DL	C4 body inferior surface - extent of osteophytes
S3_DM	C4 body inferior surface - Porosity
S3_DN	C4 body inferior surface - extent of porosity

Cervical vertebrae – degenerative change (contd.)

Variable	Description
S3 DO	C4 body inferior surface - Eburnation
S3 DP	C4 body inferior surface - extent of eburnation
S3 DQ	C4 L superior articular facet - osteophytes
S3 DR	C4 L superior articular facet - extent of osteophytes
S3 DS	C4 L superior articular facet - porosity
S3 DT	C4 L superior articular facet - extent of porosity
S3 DU	C4 L superior articular facet - eburnation
S3 DV	C4 L superior articular facet - extent of eburnation
S3 DW	C4 R superior articular facet - osteophytes
S3 DX	C4 R superior articular facet - extent of osteophytes
S3 DY	C4 R superior articular facet - porosity
S3 DZ	C4 R superior articular facet - extent of porosity
S3 EA	C4 R superior articular facet - eburnation
S3 EB	C4 R superior articular facet - extent of eburnation
S3 EC	C4 L inferior articular facet - osteophytes
S3 ED	C4 L inferior articular facet - extent of osteophytes
S3 EE	C4 L inferior articular facet - porosity
S3 EF	C4 L inferior articular facet - extent of porosity
S3 EG	C4 L inferior articular facet - eburnation
S3 EH	C4 L inferior articular facet - extent of eburnation
S3 EI	C4 R inferior AF-osteophytes
S3 EJ	C4 R inferior articular facet - extent of osteophytes
S3 EK	C4 R inferior articular facet - porosity
S3 EL	C4 R inferior articular facet - extent of porosity
S3 EM	C4 R inferior articular facet - eburnation
S3 EN	C4 R inferior articular facet - extent of eburnation
S3 EO	C5 status
S3 EP	C5 body superior surface - osteophytes
S3 EQ	C5 body superior surface - extent of osteophytes
S3 ER	C5 body superior surface - Porosity
S3 ES	C5 body superior surface - extent of porosity
S3 ET	C5 body superior surface - Eburnation
S3 EU	C5 body superior surface - extent of eburnation
S3 EV	C5 body inferior surface - osteophytes
S3 EW	C5 body inferior surface - extent of osteophytes
S3 EX	C5 body inferior surface - Porosity
S3 EY	C5 body inferior surface - extent of porosity
S3 EZ	C5 body inferior surface - Eburnation
S3 FA	C5 body inferior surface - extent of eburnation
S3 FB	C5 L superior articular facet - osteophytes
S3 FC	C5 L superior articular facet - extent of osteophytes
S3 FD	C5 L superior articular facet - porosity
S3 FE	C5 L superior articular facet - extent of porosity
S3 FF	C5 L superior articular facet - eburnation
S3 FG	C5 L superior articular facet - extent of eburnation
S3 FH	C5 R superior articular facet - osteophytes
S3 FI	C5 R superior articular facet - extent of osteophytes

Cervical vertebrae – degenerative change (contd.)

Variable	Description
S3 FJ	C5 R superior articular facet - porosity
S3 FK	C5 R superior articular facet - extent of porosity
S3 FL	C5 R superior articular facet - eburnation
S3 FM	C5 R superior articular facet - extent of eburnation
S3 FN	C5 L inferior articular facet - osteophytes
S3 FO	C5 L inferior articular facet - extent of osteophytes
S3 FP	C5 L inferior articular facet - porosity
S3 FQ	C5 L inferior articular facet - extent of porosity
S3 FR	C5 L inferior articular facet - eburnation
S3 FS	C5 L inferior articular facet - extent of eburnation
S3 FT	C5 R inferior articular facet - osteophytes
S3 FU	C5 R inferior articular facet - extent of osteophytes
S3 FV	C5 R inferior articular facet - porosity
S3 FW	C5 R inferior articular facet - extent of porosity
S3 FX	C5 R inferior articular facet - eburnation
S3 FY	C5 R inferior articular facet - extent of eburnation
S3 FZ	C6 status
S3 GA	C6 body superior surface - osteophytes
S3 GB	C6 body superior surface - extent of osteophytes
S3 GC	C6 body superior surface - Porosity
S3 GD	C6 body superior surface - extent of porosity
S3 GE	C6 body superior surface - Eburnation
S3 GF	C6 body superior surface - extent of eburnation
S3 GG	C6 body inferior surface - osteophytes
S3 GH	C6 body inferior surface - extent of osteophytes
S3 GI	C6 body inferior surface - Porosity
S3 GJ	C6 body inferior surface - extent of porosity
S3 GK	C6 body inferior surface - Eburnation
S3 GL	C6 body inferior surface - extent of eburnation
S3 GM	C6 L superior articular facet - osteophytes
S3 GN	C6 L superior articular facet - extent of osteophytes
S3 GO	C6 L superior articular facet - porosity
S3 GP	C6 L superior articular facet - extent of porosity
S3 GQ	C6 L superior articular facet - eburnation
S3 GR	C6 L superior articular facet - extent of eburnation
S3 GS	C6 R superior articular facet - osteophytes
S3 GT	C6 R superior articular facet - extent of osteophytes
S3 GU	C6 R superior articular facet - porosity
S3 GV	C6 R superior articular facet - extent of porosity
S3 GW	C6 R superior articular facet - eburnation
S3 GX	C6 R superior articular facet - extent of eburnation
S3 GY	C6 L inferior articular facet - osteophytes
S3 GZ	C6 L inferior articular facet - extent of osteophytes
S3 HA	C6 L inferior articular facet - porosity
S3 HB	C6 L inferior articular facet - extent of porosity
S3 HC	C6 L inferior articular facet - eburnation
S3 HD	C6 L inferior articular facet - extent of eburnation

Cervical vertebrae – degenerative change (contd.)

Variable	Description
S3_HE	C6 R inferior articular facet - osteophytes
S3_HF	C6 R inferior articular facet - extent of osteophytes
S3_HG	C6 R inferior articular facet - porosity
S3_HH	C6 R inferior articular facet - extent of porosity
S3_HI	C6 R inferior articular facet - eburnation
S3_HJ	C6 R inferior articular facet - extent of eburnation
S3_HK	C7 status
S3_HL	C7 body superior surface - osteophytes
S3_HM	C7 body superior surface - extent of osteophytes
S3_HN	C7 body superior surface - Porosity
S3_HO	C7 body superior surface - extent of porosity
S3_HP	C7 body superior surface - Eburnation
S3_HQ	C7 body superior surface - extent of eburnation
S3_HR	C7 body inferior surface - osteophytes
S3_HS	C7 body inferior surface - extent of osteophytes
S3_HT	C7 body inferior surface - Porosity
S3_HU	C7 body inferior surface - extent of porosity
S3_HV	C7 body inferior surface - Eburnation
S3_HW	C7 body inferior surface - extent of eburnation
S3_HX	C7 L superior articular facet - osteophytes
S3_HY	C7 L superior articular facet - extent of osteophytes
S3_HZ	C7 L superior articular facet - porosity
S3_IA	C7 L superior articular facet - extent of porosity
S3_IB	C7 L superior articular facet - eburnation
S3_IC	C7 L superior articular facet - extent of eburnation
S3_ID	C7 R superior articular facet - osteophytes
S3_IE	C7 R superior articular facet - extent of osteophytes
S3_IF	C7 R superior articular facet - porosity
S3_IG	C7 R superior articular facet - extent of porosity
S3_IH	C7 R superior articular facet - eburnation
S3_II	C7 R superior articular facet - extent of eburnation
S3_IJ	C7 L inferior articular facet - osteophytes
S3_IK	C7 L inferior articular facet - extent of osteophytes
S3_IL	C7 L inferior articular facet - porosity
S3_IM	C7 L inferior articular facet - extent of porosity
S3_IN	C7 L inferior articular facet - eburnation
S3_IO	C7 L inferior articular facet - extent of eburnation
S3_IP	C7 R inferior articular facet - osteophytes
S3_IQ	C7 R inferior articular facet - extent of osteophytes
S3_IR	C7 R inferior articular facet - porosity
S3_IS	C7 R inferior articular facet - extent of porosity
S3_IT	C7 R inferior articular facet - eburnation
S3_IU	C7 R inferior articular facet - extent of eburnation

7) Thoracic vertebrae – degenerative change

Variable	Description
S4_C	T1 status
S4_D	T1 body superior surface - osteophytes
S4_E	T1 body superior surface - extent of osteophytes
S4_F	T1 body superior surface - Porosity
S4_G	T1 body superior surface - extent of porosity
S4_H	T1 body superior surface - Eburnation
S4_I	T1 body superior surface - extent of eburnation
S4_J	T1 body inferior surface - osteophytes
S4_K	T1 body inferior surface - extent of osteophytes
S4_L	T1 body inferior surface - Porosity
S4_M	T1 body inferior surface - extent of porosity
S4_N	T1 body inferior surface - Eburnation
S4_O	T1 body inferior surface - extent of eburnation
S4_P	T1 L superior articular facet -osteophytes
S4_Q	T1 L superior articular facet - extent of osteophytes
S4_R	T1 L superior articular facet - porosity
S4_S	T1 L superior articular facet - extent of porosity
S4_T	T1 L superior articular facet - eburnation
S4_U	T1 L superior articular facet - extent of eburnation
S4_V	T1 R superior articular facet -osteophytes
S4_W	T1 R superior articular facet - extent of osteophytes
S4_X	T1 R superior articular facet - porosity
S4_Y	T1 R superior articular facet - extent of porosity
S4_Z	T1 R superior articular facet - eburnation
S4_AA	T1 R superior articular facet - extent of eburnation
S4_AB	T1 L inferior articular facet -osteophytes
S4_AC	T1 L inferior articular facet - extent of osteophytes
S4_AD	T1 L inferior articular facet - porosity
S4_AE	T1 L inferior articular facet - extent of porosity
S4_AF	T1 L inferior articular facet - eburnation
S4_AG	T1 L inferior articular facet - extent of eburnation
S4_AH	T1 R inferior articular facet -osteophytes
S4_AI	T1 R inferior articular facet - extent of osteophytes
S4_AJ	T1 R inferior articular facet - porosity
S4_AK	T1 R inferior articular facet - extent of porosity
S4_AL	T1 R inferior articular facet - eburnation
S4_AM	T1 R inferior articular facet - extent of eburnation
S4_AN	T1 L superior costal facet -osteophytes
S4_AO	T1 L superior costal facet - extent of osteophytes
S4_AP	T1 L superior costal facet - porosity
S4_AQ	T1 L superior costal facet - extent of porosity
S4_AR	T1 L superior costal facet - eburnation
S4_AS	T1 L superior costal facet - extent of eburnation
S4_AT	T1 R superior costal facet -osteophytes
S4_AU	T1 R superior costal facet - extent of osteophytes
S4_AV	T1 R superior costal facet - porosity
S4_AW	T1 R superior costal facet - extent of porosity
S4_AX	T1 R superior costal facet - eburnation
S4_AY	T1 R superior costal facet - extent of eburnation

Thoracic vertebrae – degenerative change (contd.)

Variable	Description
S4_AZ	T1 L inferior costal facet -osteophytes
S4_BA	T1 L inferior costal facet - extent of osteophytes
S4_BB	T1 L inferior costal facet - porosity
S4_BC	T1 L inferior costal facet - extent of porosity
S4_BD	T1 L inferior costal facet - eburnation
S4_BE	T1 L inferior costal facet - extent of eburnation
S4_BF	T1 R inferior costal facet -osteophytes
S4_BG	T1 R inferior costal facet - extent of osteophytes
S4_BH	T1 R inferior costal facet - porosity
S4_BI	T1 R inferior costal facet - extent of porosity
S4_BJ	T1 R inferior costal facet - eburnation
S4_BK	T1 R inferior costal facet - extent of eburnation
S4_BL	T1 L Trans pro-osteophytes
S4_BM	T1 L Transverse process - extent of osteophytes
S4_BN	T1 L Transverse process - porosity
S4_BO	T1 L Transverse process - extent of porosity
S4_BP	T1 L Transverse process - eburnation
S4_BQ	T1 L Transverse process - extent of eburnation
S4_BR	T1 R Transverse process - osteophytes
S4_BS	T1 R Transverse process - extent of osteophytes
S4_BT	T1 R Transverse process - porosity
S4_BU	T1 R Transverse process - extent of porosity
S4_BV	T1 R Transverse process - eburnation
S4_BW	T1 R Transverse process - extent of eburnation
S4_BX	T2 status
S4_BY	T2 body superior surface - osteophytes
S4_BZ	T2 body superior surface - extent of osteophytes
S4_CA	T2 body superior surface - Porosity
S4_CB	T2 body superior surface - extent of porosity
S4_CC	T2 body superior surface - Eburnation
S4_CD	T2 body superior surface - extent of eburnation
S4_CE	T2 body inferior surface - osteophytes
S4_CF	T2 body inferior surface - extent of osteophytes
S4_CG	T2 body inferior surface - Porosity
S4_CH	T2 body inferior surface - extent of porosity
S4_CI	T2 body inferior surface - Eburnation
S4_CJ	T2 body inferior surface - extent of eburnation
S4_CK	T2 L superior articular facet -osteophytes
S4_CL	T2 L superior articular facet - extent of osteophytes
S4_CM	T2 L superior articular facet - porosity
S4_CN	T2 L superior articular facet - extent of porosity
S4_CO	T2 L superior articular facet - eburnation
S4_CP	T2 L superior articular facet - extent of eburnation
S4_CQ	T2 R superior articular facet - osteophytes
S4_CR	T2 R superior articular facet - extent of osteophytes
S4_CS	T2 R superior articular facet - porosity
S4_CT	T2 R superior articular facet - extent of porosity
S4_CU	T2 R superior articular facet - eburnation
S4_CV	T2 R superior articular facet - extent of eburnation

Thoracic vertebrae – degenerative change (contd.)

Variable	Description
S4 CW	T2 L inferior articular facet -osteophytes
S4 CX	T2 L inferior articular facet - extent of osteophytes
S4 CY	T2 L inferior articular facet - porosity
S4 CZ	T2 L inferior articular facet - extent of porosity
S4 DA	T2 L inferior articular facet - eburnation
S4 DB	T2 L inferior articular facet - extent of eburnation
S4 DC	T2 R inferior articular facet -osteophytes
S4 DD	T2 R inferior articular facet - extent of osteophytes
S4 DE	T2 R inferior articular facet - porosity
S4 DF	T2 R inferior articular facet - extent of porosity
S4 DG	T2 R inferior articular facet - eburnation
S4 DH	T2 R inferior articular facet - extent of eburnation
S4 DI	T2 L superior costal facet - osteophytes
S4 DJ	T2 L superior costal facet - extent of osteophytes
S4 DK	T2 L superior costal facet - porosity
S4 DL	T2 L superior costal facet - extent of porosity
S4 DM	T2 L superior costal facet - eburnation
S4 DN	T2 L superior costal facet - extent of eburnation
S4 DO	T2 R superior costal facet -osteophytes
S4 DP	T2 R superior costal facet - extent of osteophytes
S4 DQ	T2 R superior costal facet - porosity
S4 DR	T2 R superior costal facet - extent of porosity
S4 DS	T2 R superior costal facet - eburnation
S4 DT	T2 R superior costal facet - extent of eburnation
S4 DU	T2 L inferior costal facet - osteophytes
S4 DV	T2 L inferior costal facet - extent of osteophytes
S4 DW	T2 L inferior costal facet - porosity
S4 DX	T2 L inferior costal facet - extent of porosity
S4 DY	T2 L inferior costal facet - eburnation
S4 DZ	T2 L inferior costal facet - extent of eburnation
S4 EA	T2 R inferior costal facet - osteophytes
S4 EB	T2 R inferior costal facet - extent of osteophytes
S4 EC	T2 R inferior costal facet - porosity
S4 ED	T2 R inferior costal facet - extent of porosity
S4 EE	T2 R inferior costal facet - eburnation
S4 EF	T2 R inferior costal facet - extent of eburnation
S4 EG	T2 L Trans pro-osteophytes
S4 EH	T2 L Transverse process - extent of osteophytes
S4 EI	T2 L Transverse process - porosity
S4 EJ	T2 L Transverse process - extent of porosity
S4 EK	T2 L Transverse process - eburnation
S4 EL	T2 L Transverse process - extent of eburnation
S4 EM	T2 R Transverse process - osteophytes
S4 EN	T2 R Transverse process - extent of osteophytes
S4 EO	T2 R Transverse process - porosity
S4 EP	T2 R Transverse process - extent of porosity
S4 EQ	T2 R Transverse process - eburnation
S4 ER	T2 R Transverse process - extent of eburnation

Thoracic vertebrae – degenerative change (contd.)

Variable	Description
S4 ES	T3 status
S4 ET	T3 body superior surface - osteophytes
S4 EU	T3 body superior surface - extent of osteophytes
S4 EV	T3 body superior surface - Porosity
S4 EW	T3 body superior surface - extent of porosity
S4 EX	T3 body superior surface - Eburnation
S4 EY	T3 body superior surface - extent of eburnation
S4 EZ	T3 body inferior surface - osteophytes
S4 FA	T3 body inferior surface - extent of osteophytes
S4 FB	T3 body inferior surface - Porosity
S4 FC	T3 body inferior surface - extent of porosity
S4 FD	T3 body inferior surface - Eburnation
S4 FE	T3 body inferior surface - extent of eburnation
S4 FF	T3 L superior articular facet - osteophytes
S4 FG	T3 L superior articular facet - extent of osteophytes
S4 FH	T3 L superior articular facet - porosity
S4 FI	T3 L superior articular facet - extent of porosity
S4 FJ	T3 L superior articular facet - eburnation
S4 FK	T3 L superior articular facet - extent of eburnation
S4 FL	T3 R superior articular facet - osteophytes
S4 FM	T3 R superior articular facet - extent of osteophytes
S4 FN	T3 R superior articular facet - porosity
S4 FO	T3 R superior articular facet - extent of porosity
S4 FP	T3 R superior articular facet - eburnation
S4 FQ	T3 R superior articular facet - extent of eburnation
S4 FR	T3 L inferior articular facet - osteophytes
S4 FS	T3 L inferior articular facet - extent of osteophytes
S4 FT	T3 L inferior articular facet - porosity
S4 FU	T3 L inferior articular facet - extent of porosity
S4 FV	T3 L inferior articular facet - eburnation
S4 FW	T3 L inferior articular facet - extent of eburnation
S4 FX	T3 R inferior articular facet - osteophytes
S4 FY	T3 R inferior articular facet - extent of osteophytes
S4 FZ	T3 R inferior articular facet - porosity
S4 GA	T3 R inferior articular facet - extent of porosity
S4 GB	T3 R inferior articular facet - eburnation
S4 GC	T3 R inferior articular facet - extent of eburnation
S4 GD	T3 L superior costal facet - osteophytes
S4 GE	T3 L superior costal facet - extent of osteophytes
S4 GF	T3 L superior costal facet - porosity
S4 GG	T3 L superior costal facet - extent of porosity
S4 GH	T3 L superior costal facet - eburnation
S4 GI	T3 L superior costal facet - extent of eburnation
S4 GJ	T3 R superior costal facet - osteophytes
S4 GK	T3 R superior costal facet - extent of osteophytes
S4 GL	T3 R superior costal facet - porosity
S4 GM	T3 R superior costal facet - extent of porosity
S4 GN	T3 R superior costal facet - eburnation
S4 GO	T3 R superior costal facet - extent of eburnation

Thoracic vertebrae – degenerative change (contd.)

Variable	Description
S4_GP	T3 L inferior costal facet -osteophytes
S4_GQ	T3 L inferior costal facet - extent of osteophytes
S4_GR	T3 L inferior costal facet - porosity
S4_GS	T3 L inferior costal facet - extent of porosity
S4_GT	T3 L inferior costal facet - eburnation
S4_GU	T3 L inferior costal facet - extent of eburnation
S4_GV	T3 R inferior costal facet - osteophytes
S4_GW	T3 R inferior costal facet - extent of osteophytes
S4_GX	T3 R inferior costal facet - porosity
S4_GY	T3 R inferior costal facet - extent of porosity
S4_GZ	T3 R inferior costal facet - eburnation
S4_HA	T3 R inferior costal facet - extent of eburnation
S4_HB	T3 L Transverse process - osteophytes
S4_HC	T3 L Transverse process - extent of osteophytes
S4_HD	T3 L Transverse process - porosity
S4_HE	T3 L Transverse process - extent of porosity
S4_HF	T3 L Transverse process - eburnation
S4_HG	T3 L Transverse process - extent of eburnation
S4_HH	T3 R Transverse process - osteophytes
S4_HI	T3 R Transverse process - extent of osteophytes
S4_HJ	T3 R Transverse process - porosity
S4_HK	T3 R Transverse process - extent of porosity
S4_HL	T3 R Transverse process - eburnation
S4_HM	T3 R Transverse process - extent of eburnation
S5_C	T4 status
S5_D	T4 body superior surface - osteophytes
S5_E	T4 body superior surface - extent of osteophytes
S5_F	T4 body superior surface - Porosity
S5_G	T4 body superior surface - extent of porosity
S5_H	T4 body superior surface - Eburnation
S5_I	T4 body superior surface - extent of eburnation
S5_J	T4 body inferior surface - osteophytes
S5_K	T4 body inferior surface - extent of osteophytes
S5_L	T4 body inferior surface - Porosity
S5_M	T4 body inferior surface - extent of porosity
S5_N	T4 body inferior surface - Eburnation
S5_O	T4 body inferior surface - extent of eburnation
S5_P	T4 L superior articular facet - osteophytes
S5_Q	T4 L superior articular facet - extent of osteophytes
S5_R	T4 L superior articular facet - porosity
S5_S	T4 L superior articular facet - extent of porosity
S5_T	T4 L superior articular facet - eburnation
S5_U	T4 L superior articular facet - extent of eburnation
S5_V	T4 R superior articular facet -osteophytes
S5_W	T4 R superior articular facet - extent of osteophytes
S5_X	T4 R superior articular facet - porosity
S5_Y	T4 R superior articular facet - extent of porosity

Thoracic vertebrae – degenerative change (contd.)

Variable	Description
S5_Z	T4 R superior articular facet - eburnation
S5_AA	T4 R superior articular facet - extent of eburnation
S5_AB	T4 L inferior articular facet - osteophytes
S5_AC	T4 L inferior articular facet - extent of osteophytes
S5_AD	T4 L inferior articular facet - porosity
S5_AE	T4 L inferior articular facet - extent of porosity
S5_AF	T4 L inferior articular facet - eburnation
S5_AG	T4 L inferior articular facet - extent of eburnation
S5_AH	T4 R inferior articular facet - osteophytes
S5_AI	T4 R inferior articular facet - extent of osteophytes
S5_AJ	T4 R inferior articular facet - porosity
S5_AK	T4 R inferior articular facet - extent of porosity
S5_AL	T4 R inferior articular facet - eburnation
S5_AM	T4 R inferior articular facet - extent of eburnation
S5_AN	T4 L superior costal facet - osteophytes
S5_AO	T4 L superior costal facet - extent of osteophytes
S5_AP	T4 L superior costal facet - porosity
S5_AQ	T4 L superior costal facet - extent of porosity
S5_AR	T4 L superior costal facet - eburnation
S5_AS	T4 L superior costal facet - extent of eburnation
S5_AT	T4 R superior costal facet - osteophytes
S5_AU	T4 R superior costal facet - extent of osteophytes
S5_AV	T4 R superior costal facet - porosity
S5_AW	T4 R superior costal facet - extent of porosity
S5_AX	T4 R superior costal facet - eburnation
S5_AY	T4 R superior costal facet - extent of eburnation
S5_AZ	T4 L inferior costal facet - osteophytes
S5_BA	T4 L inferior costal facet - extent of osteophytes
S5_BB	T4 L inferior costal facet - porosity
S5_BC	T4 L inferior costal facet - extent of porosity
S5_BD	T4 L inferior costal facet - eburnation
S5_BE	T4 L inferior costal facet - extent of eburnation
S5_BF	T4 R inferior costal facet - osteophytes
S5_BG	T4 R inferior costal facet - extent of osteophytes
S5_BH	T4 R inferior costal facet - porosity
S5_BI	T4 R inferior costal facet - extent of porosity
S5_BJ	T4 R inferior costal facet - eburnation
S5_BK	T4 R inferior costal facet - extent of eburnation
S5_BL	T4 L Transverse process - osteophytes
S5_BM	T4 L Transverse process - extent of osteophytes
S5_BN	T4 L Transverse process - porosity
S5_BO	T4 L Transverse process - extent of porosity
S5_BP	T4 L Transverse process - eburnation
S5_BQ	T4 L Transverse process - extent of eburnation
S5_BR	T4 R Transverse process - osteophytes
S5_BS	T4 R Transverse process - extent of osteophytes
S5_BT	T4 R Transverse process - porosity
S5_BU	T4 R Transverse process - extent of porosity

Thoracic vertebrae – degenerative change (contd.)

Variable	Description
S5_BV	T4 R Transverse process - eburnation
S5_BW	T4 R Transverse process - extent of eburnation
S5_BX	T5 status
S5_BY	T5 body superior surface - osteophytes
S5_BZ	T5 body superior surface - extent of osteophytes
S5_CA	T5 body superior surface - Porosity
S5_CB	T5 body superior surface - extent of porosity
S5_CC	T5 body superior surface - Eburnation
S5_CD	T5 body superior surface - extent of eburnation
S5_CE	T5 body inferior surface - osteophytes
S5_CF	T5 body inferior surface - extent of osteophytes
S5_CG	T5 body inferior surface - Porosity
S5_CH	T5 body inferior surface - extent of porosity
S5_CI	T5 body inferior surface - Eburnation
S5_CJ	T5 body inferior surface - extent of eburnation
S5_CK	T5 L superior articular facet - osteophytes
S5_CL	T5 L superior articular facet - extent of osteophytes
S5_CM	T5 L superior articular facet - porosity
S5_CN	T5 L superior articular facet - extent of porosity
S5_CO	T5 L superior articular facet - eburnation
S5_CP	T5 L superior articular facet - extent of eburnation
S5_CQ	T5 R superior articular facet - osteophytes
S5_CR	T5 R superior articular facet - extent of osteophytes
S5_CS	T5 R superior articular facet - porosity
S5_CT	T5 R superior articular facet - extent of porosity
S5_CU	T5 R superior articular facet - eburnation
S5_CV	T5 R superior articular facet - extent of eburnation
S5_CW	T5 L inferior articular facet - osteophytes
S5_CX	T5 L inferior articular facet - extent of osteophytes
S5_CY	T5 L inferior articular facet - porosity
S5_CZ	T5 L inferior articular facet - extent of porosity
S5_DA	T5 L inferior articular facet - eburnation
S5_DB	T5 L inferior articular facet - extent of eburnation
S5_DC	T5 R inferior articular facet - osteophytes
S5_DD	T5 R inferior articular facet - extent of osteophytes
S5_DE	T5 R inferior articular facet - porosity
S5_DF	T5 R inferior articular facet - extent of porosity
S5_DG	T5 R inferior articular facet - eburnation
S5_DH	T5 R inferior articular facet - extent of eburnation
S5_DI	T5 L superior costal facet -osteophytes
S5_DJ	T5 L superior costal facet - extent of osteophytes
S5_DK	T5 L superior costal facet - porosity
S5_DL	T5 L superior costal facet - extent of porosity
S5_DM	T5 L superior costal facet - eburnation
S5_DN	T5 L superior costal facet - extent of eburnation
S5_DO	T5 R superior costal facet - osteophytes
S5_DP	T5 R superior costal facet - extent of osteophytes
S5_DQ	T5 R superior costal facet - porosity
S5_DR	T5 R superior costal facet - extent of porosity

Thoracic vertebrae – degenerative change (contd.)

Variable	Description
S5_DS	T5 R superior costal facet - eburnation
S5_DT	T5 R superior costal facet - extent of eburnation
S5_DU	T5 L inferior costal facet - osteophytes
S5_DV	T5 L inferior costal facet - extent of osteophytes
S5_DW	T5 L inferior costal facet - porosity
S5_DX	T5 L inferior costal facet - extent of porosity
S5_DY	T5 L inferior costal facet - eburnation
S5_DZ	T5 L inferior costal facet - extent of eburnation
S5_EA	T5 R inferior costal facet - osteophytes
S5_EB	T5 R inferior costal facet - extent of osteophytes
S5_EC	T5 R inferior costal facet - porosity
S5_ED	T5 R inferior costal facet - extent of porosity
S5_EE	T5 R inferior costal facet - eburnation
S5_EF	T5 R inferior costal facet - extent of eburnation
S5_EG	T5 L Transverse process - osteophytes
S5_EH	T5 L Transverse process - extent of osteophytes
S5_EI	T5 L Transverse process - porosity
S5_EJ	T5 L Transverse process - extent of porosity
S5_EK	T5 L Transverse process - eburnation
S5_EL	T5 L Transverse process - extent of eburnation
S5_EM	T5 R Transverse process - osteophytes
S5_EN	T5 R Transverse process - extent of osteophytes
S5_EO	T5 R Transverse process - porosity
S5_EP	T5 R Transverse process - extent of porosity
S5_EQ	T5 R Transverse process - eburnation
S5_ER	T5 R Transverse process - extent of eburnation
S5_ES	T6 status
S5_ET	T6 body superior surface - osteophytes
S5_EU	T6 body superior surface - extent of osteophytes
S5_EV	T6 body superior surface - Porosity
S5_EW	T6 body superior surface - extent of porosity
S5_EX	T6 body superior surface - Eburnation
S5_EY	T6 body superior surface - extent of eburnation
S5_EZ	T6 body inferior surface - osteophytes
S5_FA	T6 body inferior surface - extent of osteophytes
S5_FB	T6 body inferior surface - Porosity
S5_FC	T6 body inferior surface - extent of porosity
S5_FD	T6 body inferior surface - Eburnation
S5_FE	T6 body inferior surface - extent of eburnation
S5_FF	T6 L superior articular facet - osteophytes
S5_FG	T6 L superior articular facet - extent of osteophytes
S5_FH	T6 L superior articular facet - porosity
S5_FI	T6 L superior articular facet - extent of porosity
S5_FJ	T6 L superior articular facet - eburnation
S5_FK	T6 L superior articular facet - extent of eburnation
S5_FL	T6 R superior articular facet -osteophytes
S5_FM	T6 R superior articular facet - extent of osteophytes
S5_FN	T6 R superior articular facet - porosity
S5_FO	T6 R superior articular facet - extent of porosity

Thoracic vertebrae – degenerative change (contd.)

Variable	Description
S5_FP	T6 R superior articular facet - eburnation
S5_FQ	T6 R superior articular facet - extent of eburnation
S5_FR	T6 L inferior articular facet - osteophytes
S5_FS	T6 L inferior articular facet - extent of osteophytes
S5_FT	T6 L inferior articular facet - porosity
S5_FU	T6 L inferior articular facet - extent of porosity
S5_FV	T6 L inferior articular facet - eburnation
S5_FW	T6 L inferior articular facet - extent of eburnation
S5_FX	T6 R inferior articular facet - osteophytes
S5_FY	T6 R inferior articular facet - extent of osteophytes
S5_FZ	T6 R inferior articular facet - porosity
S5_GA	T6 R inferior articular facet - extent of porosity
S5_GB	T6 R inferior articular facet - eburnation
S5_GC	T6 R inferior articular facet - extent of eburnation
S5_GD	T6 L superior costal facet - osteophytes
S5_GE	T6 L superior costal facet - extent of osteophytes
S5_GF	T6 L superior costal facet - porosity
S5_GG	T6 L superior costal facet - extent of porosity
S5_GH	T6 L superior costal facet - eburnation
S5_GI	T6 L superior costal facet - extent of eburnation
S5_GJ	T6 R superior costal facet - osteophytes
S5_GK	T6 R superior costal facet - extent of osteophytes
S5_GL	T6 R superior costal facet - porosity
S5_GM	T6 R superior costal facet - extent of porosity
S5_GN	T6 R superior costal facet - eburnation
S5_GO	T6 R superior costal facet - extent of eburnation
S5_GP	T6 L inferior costal facet - osteophytes
S5_GQ	T6 L inferior costal facet - extent of osteophytes
S5_GR	T6 L inferior costal facet - porosity
S5_GS	T6 L inferior costal facet - extent of porosity
S5_GT	T6 L inferior costal facet - eburnation
S5_GU	T6 L inferior costal facet - extent of eburnation
S5_GV	T6 R inferior costal facet - osteophytes
S5_GW	T6 R inferior costal facet - extent of osteophytes
S5_GX	T6 R inferior costal facet - porosity
S5_GY	T6 R inferior costal facet - extent of porosity
S5_GZ	T6 R inferior costal facet - eburnation
S5_HA	T6 R inferior costal facet - extent of eburnation
S5_HB	T6 L Transverse process - osteophytes
S5_HC	T6 L Transverse process - extent of osteophytes
S5_HD	T6 L Transverse process - porosity
S5_HE	T6 L Transverse process - extent of porosity
S5_HF	T6 L Transverse process - eburnation
S5_HG	T6 L Transverse process - extent of eburnation
S5_HH	T6 R Transverse process - osteophytes
S5_HI	T6 R Transverse process - extent of osteophytes
S5_HJ	T6 R Transverse process - porosity
S5_HK	T6 R Transverse process - extent of porosity

Thoracic vertebrae – degenerative change (contd.)

Variable	Description
S5 HL	T6 R Transverse process - eburnation
S5 HM	T6 R Transverse process - extent of eburnation
S6 C	T7 status
S6 D	T7 body superior surface - osteophytes
S6 E	T7 body superior surface - extent of osteophytes
S6 F	T7 body superior surface - Porosity
S6 G	T7 body superior surface - extent of porosity
S6 H	T7 body superior surface - Eburnation
S6 I	T7 body superior surface - extent of eburnation
S6 J	T7 body inferior surface - osteophytes
S6 K	T7 body inferior surface - extent of osteophytes
S6 L	T7 body inferior surface - Porosity
S6 M	T7 body inferior surface - extent of porosity
S6 N	T7 body inferior surface - Eburnation
S6 O	T7 body inferior surface - extent of eburnation
S6 P	T7 L superior articular facet - osteophytes
S6 Q	T7 L superior articular facet - extent of osteophytes
S6 R	T7 L superior articular facet - porosity
S6 S	T7 L superior articular facet - extent of porosity
S6 T	T7 L superior articular facet - eburnation
S6 U	T7 L superior articular facet - extent of eburnation
S6 V	T7 R superior articular facet - osteophytes
S6 W	T7 R superior articular facet - extent of osteophytes
S6 X	T7 R superior articular facet - porosity
S6 Y	T7 R superior articular facet - extent of porosity
S6 Z	T7 R superior articular facet - eburnation
S6 AA	T7 R superior articular facet - extent of eburnation
S6 AB	T7 L inferior articular facet -osteophytes
S6 AC	T7 L inferior articular facet - extent of osteophytes
S6 AD	T7 L inferior articular facet - porosity
S6 AE	T7 L inferior articular facet - extent of porosity
S6 AF	T7 L inferior articular facet - eburnation
S6 AG	T7 L inferior articular facet - extent of eburnation
S6 AH	T7 R inferior articular facet -osteophytes
S6 AI	T7 R inferior articular facet - extent of osteophytes
S6 AJ	T7 R inferior articular facet - porosity
S6 AK	T7 R inferior articular facet - extent of porosity
S6 AL	T7 R inferior articular facet - eburnation
S6 AM	T7 R inferior articular facet - extent of eburnation
S6 AN	T7 L superior costal facet - osteophytes
S6 AO	T7 L superior costal facet - extent of osteophytes
S6 AP	T7 L superior costal facet - porosity
S6 AQ	T7 L superior costal facet - extent of porosity
S6 AR	T7 L superior costal facet - eburnation
S6 AS	T7 L superior costal facet - extent of eburnation
S6 AT	T7 R superior costal facet - osteophytes
S6 AU	T7 R superior costal facet - extent of osteophytes
S6 AV	T7 R superior costal facet - porosity
S6 AW	T7 R superior costal facet - extent of porosity

Thoracic vertebrae – degenerative change (contd.)

Variable	Description
S6 AX	T7 R superior costal facet - eburnation
S6 AY	T7 R superior costal facet - extent of eburnation
S6 AZ	T7 L inferior costal facet -osteophytes
S6 BA	T7 L inferior costal facet - extent of osteophytes
S6 BB	T7 L inferior costal facet - porosity
S6 BC	T7 L inferior costal facet - extent of porosity
S6 BD	T7 L inferior costal facet - eburnation
S6 BE	T7 L inferior costal facet - extent of eburnation
S6 BF	T7 R inferior costal facet -osteophytes
S6 BG	T7 R inferior costal facet - extent of osteophytes
S6 BH	T7 R inferior costal facet - porosity
S6 BI	T7 R inferior costal facet - extent of porosity
S6 BJ	T7 R inferior costal facet - eburnation
S6 BK	T7 R inferior costal facet - extent of eburnation
S6 BL	T7 L Transverse process - osteophytes
S6 BM	T7 L Transverse process - extent of osteophytes
S6 BN	T7 L Transverse process - porosity
S6 BO	T7 L Transverse process - extent of porosity
S6 BP	T7 L Transverse process - eburnation
S6 BQ	T7 L Transverse process - extent of eburnation
S6 BR	T7 R Transverse process - osteophytes
S6 BS	T7 R Transverse process - extent of osteophytes
S6 BT	T7 R Transverse process - porosity
S6 BU	T7 R Transverse process - extent of porosity
S6 BV	T7 R Transverse process - eburnation
S6 BW	T7 R Transverse process - extent of eburnation
S6 BX	T8 status
S6 BY	T8 body superior surface - osteophytes
S6 BZ	T8 body superior surface - extent of osteophytes
S6 CA	T8 body superior surface - Porosity
S6 CB	T8 body superior surface - extent of porosity
S6 CC	T8 body superior surface - Eburnation
S6 CD	T8 body superior surface - extent of eburnation
S6 CE	T8 body inferior surface - osteophytes
S6 CF	T8 body inferior surface - extent of osteophytes
S6 CG	T8 body inferior surface - Porosity
S6 CH	T8 body inferior surface - extent of porosity
S6 CI	T8 body inferior surface - Eburnation
S6 CJ	T8 body inferior surface - extent of eburnation
S6 CK	T8 L superior articular facet - osteophytes
S6 CL	T8 L superior articular facet - extent of osteophytes
S6 CM	T8 L superior articular facet - porosity
S6 CN	T8 L superior articular facet - extent of porosity
S6 CO	T8 L superior articular facet - eburnation
S6 CP	T8 L superior articular facet - extent of eburnation
S6 CQ	T8 R superior articular facet - osteophytes
S6 CR	T8 R superior articular facet - extent of osteophytes

Thoracic vertebrae – degenerative change (contd.)

Variable	Description
S6_CS	T8 R superior articular facet - porosity
S6_CT	T8 R superior articular facet - extent of porosity
S6_CU	T8 R superior articular facet - eburnation
S6_CV	T8 R superior articular facet - extent of eburnation
S6_CW	T8 L inferior articular facet - osteophytes
S6_CX	T8 L inferior articular facet - extent of osteophytes
S6_CY	T8 L inferior articular facet - porosity
S6_CZ	T8 L inferior articular facet - extent of porosity
S6_DA	T8 L inferior articular facet - eburnation
S6_DB	T8 L inferior articular facet - extent of eburnation
S6_DC	T8 R inferior articular facet - osteophytes
S6_DD	T8 R inferior articular facet - extent of osteophytes
S6_DE	T8 R inferior articular facet - porosity
S6_DF	T8 R inferior articular facet - extent of porosity
S6_DG	T8 R inferior articular facet - eburnation
S6_DH	T8 R inferior articular facet - extent of eburnation
S6_DI	T8 L superior costal facet - osteophytes
S6_DJ	T8 L superior costal facet - extent of osteophytes
S6_DK	T8 L superior costal facet - porosity
S6_DL	T8 L superior costal facet - extent of porosity
S6_DM	T8 L superior costal facet - eburnation
S6_DN	T8 L superior costal facet - extent of eburnation
S6_DO	T8 R superior costal facet - osteophytes
S6_DP	T8 R superior costal facet - extent of osteophytes
S6_DQ	T8 R superior costal facet - porosity
S6_DR	T8 R superior costal facet - extent of porosity
S6_DS	T8 R superior costal facet - eburnation
S6_DT	T8 R superior costal facet - extent of eburnation
S6_DU	T8 L inferior costal facet - osteophytes
S6_DV	T8 L inferior costal facet - extent of osteophytes
S6_DW	T8 L inferior costal facet - porosity
S6_DX	T8 L inferior costal facet - extent of porosity
S6_DY	T8 L inferior costal facet - eburnation
S6_DZ	T8 L inferior costal facet - extent of eburnation
S6_EA	T8 R inferior costal facet - osteophytes
S6_EB	T8 R inferior costal facet - extent of osteophytes
S6_EC	T8 R inferior costal facet - porosity
S6_ED	T8 R inferior costal facet - extent of porosity
S6_EE	T8 R inferior costal facet - eburnation
S6_EF	T8 R inferior costal facet - extent of eburnation
S6_EG	T8 L Transverse process - osteophytes
S6_EH	T8 L Transverse process - extent of osteophytes
S6_EI	T8 L Transverse process - porosity
S6_EJ	T8 L Transverse process - extent of porosity
S6_EK	T8 L Transverse process - eburnation
S6_EL	T8 L Transverse process - extent of eburnation

Thoracic vertebrae – degenerative change (contd.)

Variable	Description
S6_EM	T8 R Transverse process - osteophytes
S6_EN	T8 R Transverse process - extent of osteophytes
S6_EO	T8 R Transverse process - porosity
S6_EP	T8 R Transverse process - extent of porosity
S6_EQ	T8 R Transverse process - eburnation
S6_ER	T8 R Transverse process - extent of eburnation
S6_ES	T9 status
S6_ET	T9 body superior surface - osteophytes
S6_EU	T9 body superior surface - extent of osteophytes
S6_EV	T9 body superior surface - Porosity
S6_EW	T9 body superior surface - extent of porosity
S6_EX	T9 body superior surface - Eburnation
S6_EY	T9 body superior surface - extent of eburnation
S6_EZ	T9 body inferior surface - osteophytes
S6_FA	T9 body inferior surface - extent of osteophytes
S6_FB	T9 body inferior surface - Porosity
S6_FC	T9 body inferior surface - extent of porosity
S6_FD	T9 body inferior surface - Eburnation
S6_FE	T9 body inferior surface - extent of eburnation
S6_FF	T9 L superior articular facet - osteophytes
S6_FG	T9 L superior articular facet - extent of osteophytes
S6_FH	T9 L superior articular facet - porosity
S6_FI	T9 L superior articular facet - extent of porosity
S6_FJ	T9 L superior articular facet - eburnation
S6_FK	T9 L superior articular facet - extent of eburnation
S6_FL	T9 R superior articular facet - osteophytes
S6_FM	T9 R superior articular facet - extent of osteophytes
S6_FN	T9 R superior articular facet - porosity
S6_FO	T9 R superior articular facet - extent of porosity
S6_FP	T9 R superior articular facet - eburnation
S6_FQ	T9 R superior articular facet - extent of eburnation
S6_FR	T9 L inferior articular facet - osteophytes
S6_FS	T9 L inferior articular facet - extent of osteophytes
S6_FT	T9 L inferior articular facet - porosity
S6_FU	T9 L inferior articular facet - extent of porosity
S6_FV	T9 L inferior articular facet - eburnation
S6_FW	T9 L inferior articular facet - extent of eburnation
S6_FX	T9 R inferior articular facet - osteophytes
S6_FY	T9 R inferior articular facet - extent of osteophytes
S6_FZ	T9 R inferior articular facet - porosity
S6_GA	T9 R inferior articular facet - extent of porosity
S6_GB	T9 R inferior articular facet - eburnation
S6_GC	T9 R inferior articular facet - extent of eburnation
S6_GD	T9 L superior costal facet - osteophytes
S6_GE	T9 L superior costal facet - extent of osteophytes
S6_GF	T9 L superior costal facet - porosity
S6_GG	T9 L superior costal facet - extent of porosity
S6_GH	T9 L superior costal facet - eburnation
S6_GI	T9 L superior costal facet - extent of eburnation

Thoracic vertebrae – degenerative change (contd.)

Variable	Description
S6_GJ	T9 R superior costal facet - osteophytes
S6_GK	T9 R superior costal facet - extent of osteophytes
S6_GL	T9 R superior costal facet - porosity
S6_GM	T9 R superior costal facet - extent of porosity
S6_GN	T9 R superior costal facet - eburnation
S6_GO	T9 R superior costal facet - extent of eburnation
S6_GP	T9 L inferior costal facet - osteophytes
S6_GQ	T9 L inferior costal facet - extent of osteophytes
S6_GR	T9 L inferior costal facet - porosity
S6_GS	T9 L inferior costal facet - extent of porosity
S6_GT	T9 L inferior costal facet - eburnation
S6_GU	T9 L inferior costal facet - extent of eburnation
S6_GV	T9 R inferior costal facet - osteophytes
S6_GW	T9 R inferior costal facet - extent of osteophytes
S6_GX	T9 R inferior costal facet - porosity
S6_GY	T9 R inferior costal facet - extent of porosity
S6_GZ	T9 R inferior costal facet - eburnation
S6_HA	T9 R inferior costal facet - extent of eburnation
S6_HB	T9 L Transverse process - osteophytes
S6_HC	T9 L Transverse process - extent of osteophytes
S6_HD	T9 L Transverse process - porosity
S6_HE	T9 L Transverse process - extent of porosity
S6_HF	T9 L Transverse process - eburnation
S6_HG	T9 L Transverse process - extent of eburnation
S6_HH	T9 R Transverse process - osteophytes
S6_HI	T9 R Transverse process - extent of osteophytes
S6_HJ	T9 R Transverse process - porosity
S6_HK	T9 R Transverse process - extent of porosity
S6_HL	T9 R Transverse process - eburnation
S6_HM	T9 R Transverse process - extent of eburnation
S7_C	T10 status
S7_D	T10 body superior surface - osteophytes
S7_E	T10 body superior surface - extent of osteophytes
S7_F	T10 body superior surface - Porosity
S7_G	T10 body superior surface - extent of porosity
S7_H	T10 body superior surface - Eburnation
S7_I	T10 body superior surface - extent of eburnation
S7_J	T10 body inferior surface - osteophytes
S7_K	T10 body inferior surface - extent of osteophytes
S7_L	T10 body inferior surface - Porosity
S7_M	T10 body inferior surface - extent of porosity
S7_N	T10 body inferior surface - Eburnation
S7_O	T10 body inferior surface - extent of eburnation
S7_P	T10 L superior articular facet - osteophytes
S7_Q	T10 L superior articular facet - extent of osteophytes
S7_R	T10 L superior articular facet - porosity
S7_S	T10 L superior articular facet - extent of porosity
S7_T	T10 L superior articular facet - eburnation
S7_U	T10 L superior articular facet - extent of eburnation

Thoracic vertebrae – degenerative change (contd.)

Variable	Description
S7_V	T10 R superior articular facet - osteophytes
S7_W	T10 R superior articular facet - extent of osteophytes
S7_X	T10 R superior articular facet - porosity
S7_Y	T10 R superior articular facet - extent of porosity
S7_Z	T10 R superior articular facet - eburnation
S7_AA	T10 R superior articular facet - extent of eburnation
S7_AB	T10 L inferior articular facet - osteophytes
S7_AC	T10 L inferior articular facet - extent of osteophytes
S7_AD	T10 L inferior articular facet - porosity
S7_AE	T10 L inferior articular facet - extent of porosity
S7_AF	T10 L inferior articular facet - eburnation
S7_AG	T10 L inferior articular facet - extent of eburnation
S7_AH	T10 R inferior articular facet - osteophytes
S7_AI	T10 R inferior articular facet - extent of osteophytes
S7_AJ	T10 R inferior articular facet - porosity
S7_AK	T10 R inferior articular facet - extent of porosity
S7_AL	T10 R inferior articular facet - eburnation
S7_AM	T10 R inferior articular facet - extent of eburnation
S7_AN	T10 L superior costal facet - osteophytes
S7_AO	T10 L superior costal facet - extent of osteophytes
S7_AP	T10 L superior costal facet - porosity
S7_AQ	T10 L superior costal facet - extent of porosity
S7_AR	T10 L superior costal facet - eburnation
S7_AS	T10 L superior costal facet - extent of eburnation
S7_AT	T10 R superior costal facet - osteophytes
S7_AU	T10 R superior costal facet - extent of osteophytes
S7_AV	T10 R superior costal facet - porosity
S7_AW	T10 R superior costal facet - extent of porosity
S7_AX	T10 R superior costal facet - eburnation
S7_AY	T10 R superior costal facet - extent of eburnation
S7_AZ	T10 L inferior costal facet - osteophytes
S7_BA	T10 L inferior costal facet - extent of osteophytes
S7_BB	T10 L inferior costal facet - porosity
S7_BC	T10 L inferior costal facet - extent of porosity
S7_BD	T10 L inferior costal facet - eburnation
S7_BE	T10 L inferior costal facet - extent of eburnation
S7_BF	T10 R inferior costal facet - osteophytes
S7_BG	T10 R inferior costal facet - extent of osteophytes
S7_BH	T10 R inferior costal facet - porosity
S7_BI	T10 R inferior costal facet - extent of porosity
S7_BJ	T10 R inferior costal facet - eburnation
S7_BK	T10 R inferior costal facet - extent of eburnation
S7_BL	T10 L Transverse process -osteophytes
S7_BM	T10 L Transverse process - extent of osteophytes
S7_BN	T10 L Transverse process - porosity
S7_BO	T10 L Transverse process - extent of porosity
S7_BP	T10 L Transverse process - eburnation
S7_BQ	T10 L Transverse process - extent of eburnation

Thoracic vertebrae – degenerative change (contd.)

Variable	Description
S7_BR	T10 R Transverse process - osteophytes
S7_BS	T10 R Transverse process - extent of osteophytes
S7_BT	T10 R Transverse process - porosity
S7_BU	T10 R Transverse process - extent of porosity
S7_BV	T10 R Transverse process - eburnation
S7_BW	T10 R Transverse process - extent of eburnation
S7_BX	T11 status
S7_BY	T11 body superior surface - osteophytes
S7_BZ	T11 body superior surface - extent of osteophytes
S7_CA	T11 body superior surface - Porosity
S7_CB	T11 body superior surface - extent of porosity
S7_CC	T11 body superior surface - Eburnation
S7_CD	T11 body superior surface - extent of eburnation
S7_CE	T11 body inferior surface - osteophytes
S7_CF	T11 body inferior surface - extent of osteophytes
S7_CG	T11 body inferior surface - Porosity
S7_CH	T11 body inferior surface - extent of porosity
S7_CI	T11 body inferior surface - Eburnation
S7_CJ	T11 body inferior surface - extent of eburnation
S7_CK	T11 L superior articular facet -osteophytes
S7_CL	T11 L superior articular facet - extent of osteophytes
S7_CM	T11 L superior articular facet - porosity
S7_CN	T11 L superior articular facet - extent of porosity
S7_CO	T11 L superior articular facet - eburnation
S7_CP	T11 L superior articular facet - extent of eburnation
S7_CQ	T11 R superior articular facet -osteophytes
S7_CR	T11 R superior articular facet - extent of osteophytes
S7_CS	T11 R superior articular facet - porosity
S7_CT	T11 R superior articular facet - extent of porosity
S7_CU	T11 R superior articular facet - eburnation
S7_CV	T11 R superior articular facet - extent of eburnation
S7_CW	T11 L inferior articular facet - osteophytes
S7_CX	T11 L inferior articular facet - extent of osteophytes
S7_CY	T11 L inferior articular facet - porosity
S7_CZ	T11 L inferior articular facet - extent of porosity
S7_DA	T11 L inferior articular facet - eburnation
S7_DB	T11 L inferior articular facet - extent of eburnation
S7_DC	T11 R inferior articular facet -osteophytes
S7_DD	T11 R inferior articular facet - extent of osteophytes
S7_DE	T11 R inferior articular facet - porosity
S7_DF	T11 R inferior articular facet - extent of porosity
S7_DG	T11 R inferior articular facet - eburnation
S7_DH	T11 R inferior articular facet - extent of eburnation
S7_DI	T11 L costal facet - osteophytes
S7_DJ	T11 L costal facet - extent of osteophytes
S7_DK	T11 L costal facet - porosity
S7_DL	T11 L costal facet - extent of porosity
S7_DM	T11 L costal facet - eburnation
S7_DN	T11 L costal facet - extent of eburnation

Thoracic vertebrae – degenerative change (contd.)

Variable	Description
S7_DO	T11 R costal facet - osteophytes
S7_DP	T11 R costal facet - extent of osteophytes
S7_DQ	T11 R costal facet - porosity
S7_DR	T11 R costal facet - extent of porosity
S7_DS	T11 R costal facet - eburnation
S7_DT	T11 R costal facet - extent of eburnation
S7_DU	T11 L Transverse process - osteophytes
S7_DV	T11 L Transverse process - extent of osteophytes
S7_DW	T11 L Transverse process - porosity
S7_DX	T11 L Transverse process - extent of porosity
S7_DY	T11 L Transverse process - eburnation
S7_DZ	T11 L Transverse process - extent of eburnation
S7_EA	T11 R Transverse process - osteophytes
S7_EB	T11 R Transverse process - extent of osteophytes
S7_EC	T11 R Transverse process - porosity
S7_ED	T11 R Transverse process - extent of porosity
S7_EE	T11 R Transverse process - eburnation
S7_EF	T11 R Transverse process - extent of eburnation
S7_EG	T12 status
S7_EH	T12 body superior surface - osteophytes
S7_EI	T12 body superior surface - extent of osteophytes
S7_EJ	T12 body superior surface - Porosity
S7_EK	T12 body superior surface - extent of porosity
S7_EL	T12 body superior surface - Eburnation
S7_EM	T12 body superior surface - extent of eburnation
S7_EN	T12 body inferior surface - osteophytes
S7_EO	T12 body inferior surface - extent of osteophytes
S7_EP	T12 body inferior surface - Porosity
S7_EQ	T12 body inferior surface - extent of porosity
S7_ER	T12 body inferior surface - Eburnation
S7_ES	T12 body inferior surface - extent of eburnation
S7_ET	T12 L superior articular facet -osteophytes
S7_EU	T12 L superior articular facet - extent of osteophytes
S7_EV	T12 L superior articular facet - porosity
S7_EW	T12 L superior articular facet - extent of porosity
S7_EX	T12 L superior articular facet - eburnation
S7_EY	T12 L superior articular facet - extent of eburnation
S7_EZ	T12 R superior articular facet -osteophytes
S7_FA	T12 R superior articular facet - extent of osteophytes
S7_FB	T12 R superior articular facet - porosity
S7_FC	T12 R superior articular facet - extent of porosity
S7_FD	T12 R superior articular facet - eburnation
S7_FE	T12 R superior articular facet - extent of eburnation
S7_FF	T12 L inferior articular facet -osteophytes
S7_FG	T12 L inferior articular facet - extent of osteophytes
S7_FH	T12 L inferior articular facet - porosity
S7_FI	T12 L inferior articular facet - extent of porosity
S7_FJ	T12 L inferior articular facet - eburnation
S7_FK	T12 L inferior articular facet - extent of eburnation

Thoracic vertebrae – degenerative change (contd.)

Variable	Description
S7_FL	T12 R inferior articular facet - osteophytes
S7_FM	T12 R inferior articular facet - extent of osteophytes
S7_FN	T12 R inferior articular facet - porosity
S7_FO	T12 R inferior articular facet - extent of porosity
S7_FP	T12 R inferior articular facet - eburnation
S7_FQ	T12 R inferior articular facet - extent of eburnation
S7_FR	T12 L costal facet - osteophytes
S7_FS	T12 L costal facet - extent of osteophytes
S7_FT	T12 L costal facet - porosity
S7_FU	T12 L costal facet - extent of porosity
S7_FV	T12 L costal facet - eburnation
S7_FW	T12 L costal facet - extent of eburnation
S7_FX	T12 R costal facet - osteophytes
S7_FY	T12 R costal facet - extent of osteophytes
S7_FZ	T12 R costal facet - porosity
S7_GA	T12 R costal facet - extent of porosity
S7_GB	T12 R costal facet - eburnation
S7_GC	T12 R costal facet - extent of eburnation
S7_GD	T12 L Transverse process - osteophytes
S7_GE	T12 L Transverse process - extent of osteophytes
S7_GF	T12 L Transverse process - porosity
S7_GG	T12 L Transverse process - extent of porosity
S7_GH	T12 L Transverse process - eburnation
S7_GI	T12 L Transverse process - extent of eburnation
S7_GJ	T12 R Transverse process - osteophytes
S7_GK	T12 R Transverse process - extent of osteophytes
S7_GL	T12 R Transverse process - porosity
S7_GM	T12 R Transverse process - extent of porosity
S7_GN	T12 R Transverse process - eburnation
S7_GO	T12 R Transverse process - extent of eburnation

8) Lumbar vertebrae – degenerative change

Variable	Description
S8_C	L1 status
S8_D	L1 body superior surface - osteophytes
S8_E	L1 body superior surface - extent of osteophytes
S8_F	L1 body superior surface - Porosity
S8_G	L1 body superior surface - extent of porosity
S8_H	L1 body superior surface - Eburnation
S8_I	L1 body superior surface - extent of eburnation
S8_J	L1 body inferior surface - osteophytes
S8_K	L1 body inferior surface - extent of osteophytes
S8_L	L1 body inferior surface - Porosity
S8_M	L1 body inferior surface - extent of porosity
S8_N	L1 body inferior surface - Eburnation
S8_O	L1 body inferior surface - extent of eburnation

Lumbar vertebrae – degenerative change (contd.)

Variable	Description
S8_P	L1 L superior articular facet - osteophytes
S8_Q	L1 L superior articular facet - extent of osteophytes
S8_R	L1 L superior articular facet - porosity
S8_S	L1 L superior articular facet - extent of porosity
S8_T	L1 L superior articular facet - eburnation
S8_U	L1 L superior articular facet - extent of eburnation
S8_V	L1 R superior articular facet - osteophytes
S8_W	L1 R superior articular facet - extent of osteophytes
S8_X	L1 R superior articular facet - porosity
S8_Y	L1 R superior articular facet - extent of porosity
S8_Z	L1 R superior articular facet - eburnation
S8_AA	L1 R superior articular facet - extent of eburnation
S8_AB	L1 L inferior articular facet - osteophytes
S8_AC	L1 L inferior articular facet - extent of osteophytes
S8_AD	L1 L inferior articular facet - porosity
S8_AE	L1 L inferior articular facet - extent of porosity
S8_AF	L1 L inferior articular facet - eburnation
S8_AG	L1 L inferior articular facet - extent of eburnation
S8_AH	L1 R inferior articular facet - osteophytes
S8_AI	L1 R inferior articular facet - extent of osteophytes
S8_AJ	L1 R inferior articular facet - porosity
S8_AK	L1 R inferior articular facet - extent of porosity
S8_AL	L1 R inferior articular facet - eburnation
S8_AM	L1 R inferior articular facet - extent of eburnation
S8_AN	L2 status
S8_AO	L2 body superior surface - osteophytes
S8_AP	L2 body superior surface - extent of osteophytes
S8_AQ	L2 body superior surface - Porosity
S8_AR	L2 body superior surface - extent of porosity
S8_AS	L2 body superior surface - Eburnation
S8_AT	L2 body superior surface - extent of eburnation
S8_AU	L2 body inferior surface - osteophytes
S8_AV	L2 body inferior surface - extent of osteophytes
S8_AW	L2 body inferior surface - Porosity
S8_AX	L2 body inferior surface - extent of porosity
S8_AY	L2 body inferior surface - Eburnation
S8_AZ	L2 body inferior surface - extent of eburnation
S8_BA	L2 L superior articular facet - osteophytes
S8_BB	L2 L superior articular facet - extent of osteophytes
S8_BC	L2 L superior articular facet - porosity
S8_BD	L2 L superior articular facet - extent of porosity
S8_BE	L2 L superior articular facet - eburnation
S8_BF	L2 L superior articular facet - extent of eburnation
S8_BG	L2 R superior articular facet - osteophytes
S8_BH	L2 R superior articular facet - extent of osteophytes
S8_BI	L2 R superior articular facet - porosity
S8_BJ	L2 R superior articular facet - extent of porosity
S8_BK	L2 R superior articular facet - eburnation
S8_BL	L2 R superior articular facet - extent of eburnation

Lumbar vertebrae – degenerative change (contd.)

Variable	Description
S8_BM	L2 L inferior articular facet - osteophytes
S8_BN	L2 L inferior articular facet - extent of osteophytes
S8_BO	L2 L inferior articular facet - porosity
S8_BP	L2 L inferior articular facet - extent of porosity
S8_BQ	L2 L inferior articular facet - eburnation
S8_BR	L2 L inferior articular facet - extent of eburnation
S8_BS	L2 R inferior articular facet - osteophytes
S8_BT	L2 R inferior articular facet - extent of osteophytes
S8_BU	L2 R inferior articular facet - porosity
S8_BV	L2 R inferior articular facet - extent of porosity
S8_BW	L2 R inferior articular facet - eburnation
S8_BX	L2 R inferior articular facet - extent of eburnation
S8_BY	L3 status
S8_BZ	L3 body superior surface - osteophytes
S8_CA	L3 body superior surface - extent of osteophytes
S8_CB	L3 body superior surface - Porosity
S8_CC	L3 body superior surface - extent of porosity
S8_CD	L3 body superior surface - Eburnation
S8_CE	L3 body superior surface - extent of eburnation
S8_CF	L3 body inferior surface - osteophytes
S8_CG	L3 body inferior surface - extent of osteophytes
S8_CH	L3 body inferior surface - Porosity
S8_CI	L3 body inferior surface - extent of porosity
S8_CJ	L3 body inferior surface - Eburnation
S8_CK	L3 body inferior surface - extent of eburnation
S8_CL	L3 L superior articular facet - osteophytes
S8_CM	L3 L superior articular facet - extent of osteophytes
S8_CN	L3 L superior articular facet - porosity
S8_CO	L3 L superior articular facet - extent of porosity
S8_CP	L3 L superior articular facet - eburnation
S8_CQ	L3 L superior articular facet - extent of eburnation
S8_CR	L3 R superior articular facet -osteophytes
S8_CS	L3 R superior articular facet - extent of osteophytes
S8_CT	L3 R superior articular facet - porosity
S8_CU	L3 R superior articular facet - extent of porosity
S8_CV	L3 R superior articular facet - eburnation
S8_CW	L3 R superior articular facet - extent of eburnation
S8_CX	L3 L inferior articular facet - osteophytes
S8_CY	L3 L inferior articular facet - extent of osteophytes
S8_CZ	L3 L inferior articular facet - porosity
S8_DA	L3 L inferior articular facet - extent of porosity
S8_DB	L3 L inferior articular facet - eburnation
S8_DC	L3 L inferior articular facet - extent of eburnation
S8_DD	L3 R inferior articular facet - osteophytes
S8_DE	L3 R inferior articular facet - extent of osteophytes
S8_DF	L3 R inferior articular facet - porosity
S8_DG	L3 R inferior articular facet - extent of porosity
S8_DH	L3 R inferior articular facet - eburnation
S8_DI	L3 R inferior articular facet - extent of eburnation

Lumbar vertebrae – degenerative change (contd.)

Variable	Description
S8 DJ	L4 status
S8 DK	L4 body superior surface - osteophytes
S8 DL	L4 body superior surface - extent of osteophytes
S8 DM	L4 body superior surface - Porosity
S8 DN	L4 body superior surface - extent of porosity
S8 DO	L4 body superior surface - Eburnation
S8 DP	L4 body superior surface - extent of eburnation
S8 DQ	L4 body inferior surface - osteophytes
S8 DR	L4 body inferior surface - extent of osteophytes
S8 DS	L4 body inferior surface - Porosity
S8 DT	L4 body inferior surface - extent of porosity
S8 DU	L4 body inferior surface - Eburnation
S8 DV	L4 body inferior surface - extent of eburnation
S8 DW	L4 L superior articular facet - osteophytes
S8 DX	L4 L superior articular facet - extent of osteophytes
S8 DY	L4 L superior articular facet - porosity
S8 DZ	L4 L superior articular facet - extent of porosity
S8 EA	L4 L superior articular facet - eburnation
S8 EB	L4 L superior articular facet - extent of eburnation
S8 EC	L4 R superior articular facet - osteophytes
S8 ED	L4 R superior articular facet - extent of osteophytes
S8 EE	L4 R superior articular facet - porosity
S8 EF	L4 R superior articular facet - extent of porosity
S8 EG	L4 R superior articular facet - eburnation
S8 EH	L4 R superior articular facet - extent of eburnation
S8 EI	L4 L inferior articular facet - osteophytes
S8 EJ	L4 L inferior articular facet - extent of osteophytes
S8 EK	L4 L inferior articular facet - porosity
S8 EL	L4 L inferior articular facet - extent of porosity
S8 EM	L4 L inferior articular facet - eburnation
S8 EN	L4 L inferior articular facet - extent of eburnation
S8 EO	L4 R inferior articular facet - osteophytes
S8 EP	L4 R inferior articular facet - extent of osteophytes
S8 EQ	L4 R inferior articular facet - porosity
S8 ER	L4 R inferior articular facet - extent of porosity
S8 ES	L4 R inferior articular facet - eburnation
S8 ET	L4 R inferior articular facet - extent of eburnation
S8 EU	L5 status
S8 EV	L5 body superior surface - osteophytes
S8 EW	L5 body superior surface - extent of osteophytes
S8 EX	L5 body superior surface - Porosity
S8 EY	L5 body superior surface - extent of porosity
S8 EZ	L5 body superior surface - Eburnation
S8 FA	L5 body superior surface - extent of eburnation
S8 FB	L5 body inferior surface - osteophytes
S8 FC	L5 body inferior surface - extent of osteophytes
S8 FD	L5 body inferior surface - Porosity
S8 FE	L5 body inferior surface - extent of porosity

Lumbar vertebrae – degenerative change (contd.)

Variable	Description
S8_FF	L5 body inferior surface - Eburnation
S8_FG	L5 body inferior surface - extent of eburnation
S8_FH	L5 L superior articular facet - osteophytes
S8_FI	L5 L superior articular facet - extent of osteophytes
S8_FJ	L5 L superior articular facet - porosity
S8_FK	L5 L superior articular facet - extent of porosity
S8_FL	L5 L superior articular facet - eburnation
S8_FM	L5 L superior articular facet - extent of eburnation
S8_FN	L5 R superior articular facet - osteophytes
S8_FO	L5 R superior articular facet - extent of osteophytes
S8_FP	L5 R superior articular facet - porosity
S8_FQ	L5 R superior articular facet - extent of porosity
S8_FR	L5 R superior articular facet - eburnation
S8_FS	L5 R superior articular facet - extent of eburnation
S8_FT	L5 L inferior articular facet - osteophytes
S8_FU	L5 L inferior articular facet - extent of osteophytes
S8_FV	L5 L inferior articular facet - porosity
S8_FW	L5 L inferior articular facet - extent of porosity
S8_FX	L5 L inferior articular facet - eburnation
S8_FY	L5 L inferior articular facet - extent of eburnation
S8_FZ	L5 R inferior articular facet - osteophytes
S8_GA	L5 R inferior articular facet - extent of osteophytes
S8_GB	L5 R inferior articular facet - porosity
S8_GC	L5 R inferior articular facet - extent of porosity
S8_GD	L5 R inferior articular facet - eburnation
S8_GE	L5 R inferior articular facet - extent of eburnation

9) Sacral vertebra – degenerative change

Variable	Description
S8_GF	S1 status
S8_GG	S1 body superior surface - osteophytes
S8_GH	S1 body superior surface - extent of osteophytes
S8_GI	S1 body superior surface - Porosity
S8_GJ	S1 body superior surface - extent of porosity
S8_GK	S1 body superior surface - Eburnation
S8_GL	S1 body superior surface - extent of eburnation
S8_GM	S1 L superior articular facet - osteophytes
S8_GN	S1 L superior articular facet - extent of osteophytes
S8_GO	S1 L superior articular facet - porosity
S8_GP	S1 L superior articular facet - extent of porosity
S8_GQ	S1 L superior articular facet - eburnation
S8_GR	S1 L superior articular facet - extent of eburnation
S8_GS	S1 R superior articular facet - osteophytes
S8_GT	S1 R superior articular facet - extent of osteophytes
S8_GU	S1 R superior articular facet - porosity
S8_GV	S1 R superior articular facet - extent of porosity
S8_GW	S1 R superior articular facet - eburnation
S8_GX	S1 R superior articular facet - extent of eburnation

10) Occipital condyles – degenerative change

Variable	Description
S8_GY	Occipital condyles status
S8_GZ	Occipital condyles L- osteophytes
S8_HA	Occipital condyles L - extent of osteophytes
S8_HB	Occipital condyles L - porosity
S8_HC	Occipital condyles L - extent of porosity
S8_HD	Occipital condyles L - eburnation
S8_HE	Occipital condyles L - extent of eburnation
S8_HF	Occipital condyles R- osteophytes
S8_HG	Occipital condyles R - extent of osteophytes
S8_HH	Occipital condyles R - porosity
S8_HI	Occipital condyles R - extent of porosity
S8_HJ	Occipital condyles R - eburnation
S8_HK	Occipital condyles R - extent of eburnation

11) Calculated variables - Absolute difference in paired measurements

Variable	Description
S1_V-W	Maximum innominate length
S1_X-Y	Innominate breadth
S1_Z-AA	Iliac height
S1_AB-AC	Acetabulum diameter
S1_AD-AE	Pubis length
S1_AF-AG	Minimum height of inferior pubic ramus
S1_AH-AI	Oblique length of inferior pubic ramus
S1_AJ-AK	Tubercolusymphyseal height
S1_AL-AM	Pubic acetabular length
S1_AN-AO	Pubic tubercle- acetabular length
S1_AP-AQ	Ischial acetabular height
S1_AR-AS	Pubo-sacroiliac diameter
S1_AT-AU	Pubic symphysis depth
S1_AV-AW	Pubic symphysis superior width
S1_AX-AY	Pubic symphysis inferior width
S1_AZ-BA	Maximum width of pubic symphysis
S1_BB-BC	Ischial spine to symphysion
S1_BD-BE	Symphyseal angle
S1_BF-BG	Acetabulosciatic breadth
S1_BH-BI	Ischium length
S1_BJ-BK	Maximum length of obturator foramen
S1_BL-BM	Maximum width of obturator foramen
S1_BN-BO	Auricular surface profile – a
S1_BP-BQ	Auricular surface profile – b
S1_BR-BS	Auricular surface profile – c
S1_BT-BU	Auricular surface profile – d
S1_Bv-BW	Auricular surface profile – e
S1_BX-BY	Auricular surface profile – f
S1_BZ-CA	Sciatic notch width
S1_CB-CC	Sciatic notch height
S1_CD-CE	Sciatic notch position
S1_CM-CN	Ischial spine to sacral apex
S1_CO-CP	Ischial tuberosity to sacral apex

Appendix 4

Case summaries

Table 7.1(xiv) Case summary for sacral measurements for total sample

Variable	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Maximum superior sacral width	97	94.2	6	5.8	103	100.0
Maximum inferior sacral width	83	80.6	20	19.4	103	100.0
Maximum transverse diameter of S1	75	72.8	28	27.2	103	100.0
Maximum A-P diameter of S1	90	87.4	13	12.6	103	100.0
Height of body of first sacral vertebra	72	69.9	31	30.1	103	100.0
Promontorium angle	92	89.3	11	10.7	103	100.0
Mid-ventral curved length	55	53.4	48	46.6	103	100.0
Distance of medial borders of processus articulares superiores	95	92.2	8	7.8	103	100.0
Distance of lateral borders of processus articulares superiores	91	88.3	12	11.7	103	100.0
Spinal canal maximum transverse width	98	95.1	5	4.9	103	100.0
Spinal canal maximum A-P width	8	7.8	95	92.2	103	100.0
Combined transverse width of alae	71	68.9	32	31.1	103	100.0
Anterior mid-ventral straight height of sacrum	58	56.3	45	43.7	103	100.0
Maximum depth of curvature of sacrum	48	46.6	55	53.4	103	100.0
Position of maximum depth of curvature of sacrum	48	46.6	55	53.4	103	100.0

Table 7.1(xv) Case summary for sacral measurements for female group

Variable	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Maximum superior sacral width	58	93.5	4	6.5	62	100.0
Maximum inferior sacral width	45	72.6	17	27.4	62	100.0
Maximum transverse diameter of S1	44	71.0	18	29.0	62	100.0
Maximum A-P diameter of S1	56	90.3	6	9.7	62	100.0
Height of body of first sacral vertebra	42	67.8	20	32.2	62	100.0
Promontorium angle	57	91.9	5	8.1	62	100.0
Mid-ventral curved length	28	45.2	34	54.8	62	100.0
Distance of medial borders of processus articulares superiores	54	87.1	8	12.9	62	100.0
Distance of lateral borders of processus articulares superiores	53	85.5	9	14.5	62	100.0
Spinal canal maximum transverse width	57	91.9	5	8.1	62	100.0
Spinal canal maximum A-P width	4	6.5	58	93.5	62	100.0
Combined transverse width of alae	42	67.8	20	32.2	62	100.0
Anterior mid-ventral straight height of sacrum	30	48.4	32	51.6	62	100.0
Maximum depth of curvature of sacrum	27	43.5	35	56.5	62	100.0
Position of maximum depth of curvature of sacrum	27	43.5	35	56.5	62	100.0

Table 7.1(xvi) Case summary for sacral measurements for male group

Variable	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Maximum superior sacral width	39	95.1	2	4.9	41	100.0
Maximum inferior sacral width	38	92.7	3	7.3	41	100.0
Maximum transverse diameter of S1	31	75.6	10	2.4	41	100.0
Maximum A-P diameter of S1	34	82.9	7	17.1	41	100.0
Height of body of first sacral vertebra	30	73.2	11	26.8	41	100.0
Promontorium angle	35	85.4	6	14.6	41	100.0
Mid-ventral curved length	27	65.9	14	34.1	41	100.0
Distance of medial borders of processus articulares superiores	41	100.0	0	0	41	100.0
Distance of lateral borders of processus articulares superiores	38	92.7	3	7.3	41	100.0
Spinal canal maximum transverse width	41	100.0	0	0	41	100.0
Spinal canal maximum A-P width	4	9.8	37	90.2	41	100.0
Combined transverse width of alae	29	70.7	12	29.3	41	100.0
Anterior mid-ventral straight height of sacrum	28	68.3	13	31.7	41	100.0
Maximum depth of curvature of sacrum	21	51.2	20	48.8	41	100.0
Position of maximum depth of curvature of sacrum	21	51.2	20	48.8	41	100.0

Table 7.1(xvii) Case summary for innominate measurements for total sample

Variable	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
LEFT Maximum innominate length (cm)	90	87.4	13	12.6	103	100.0
RIGHT Maximum innominate length (cm)	93	90.1	10	9.9	103	100.0
LEFT Innominate breadth (cm)	81	78.6	22	21.4	103	100.0
RIGHT Innominate breadth (cm)	81	78.6	22	21.4	103	100.0
LEFT Iliac height	96	93.2	7	6.8	103	100.0
RIGHT Iliac height	96	93.2	7	6.8	103	100.0
LEFT Acetabulum diameter	91	88.3	12	11.7	103	100.0
RIGHT Acetabulum diameter	95	92.2	8	7.8	103	100.0
LEFT Pubis length	61	59.2	42	40.8	103	100.0
RIGHT Pubis length	66	64.1	37	35.9	103	100.0
LEFT Minimum height of inferior pubic ramus	85	82.5	18	17.5	103	100.0
RIGHT Minimum height of inferior pubic ramus	91	88.3	12	11.7	103	100.0
LEFT Oblique length of inferior pubic ramus	76	73.8	27	26.2	103	100.0
RIGHT Oblique length of inferior pubic ramus	80	77.7	23	25.3	103	100.0
LEFT Tubercolusymphyseal height	46	44.7	57	55.3	103	100.0
RIGHT Tubercolusymphyseal height	43	41.7	60	58.3	103	100.0
LEFT Pubic acetabular length	63	61.2	40	38.8	103	100.0
RIGHT Pubic acetabular length	67	65.0	36	35.0	103	100.0
LEFT Pubic tubercle-acetabular length	45	43.7	58	56.3	103	100.0
RIGHT Pubic tubercle-acetabular length	44	42.7	59	57.3	103	100.0
LEFT Ischial acetabular height	90	87.4	13	12.6	103	100.0
RIGHT Ischial acetabular height	93	90.1	10	9.9	103	100.0
LEFT Pubo-sacroiliac diameter	60	58.3	43	41.7	103	100.0
RIGHT Pubo-sacroiliac diameter	64	62.1	39	37.9	103	100.0

Table 7.1(xvii) Case summary for innominate measurements for total sample (contd.)

Variable	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
LEFT Pubic symphysis depth	66	64.1	37	35.9	103	100.0
RIGHT Pubic symphysis depth	68	66.0	35	34.0	103	100.0
LEFT Pubic symphysis superior width	66	64.1	37	35.9	103	100.0
RIGHT Pubic symphysis superior width	68	66.0	35	34.0	103	100.0
LEFT Pubic symphysis inferior width	66	64.1	37	35.9	103	100.0
RIGHT Pubic symphysis inferior width	67	65.0	36	35.0	103	100.0
LEFT Maximum width of pubic symphysis	69	67.0	34	33.0	103	100.0
RIGHT Maximum width of pubic symphysis	69	67.0	34	33.0	103	100.0
LEFT Ischial spine to symphysis	30	29.1	73	70.9	103	100.0
RIGHT Ischial spine to symphysis	22	21.4	81	78.6	103	100.0
LEFT Symphyseal angle	71	68.9	32	31.1	103	100.0
RIGHT Symphyseal angle	74	71.8	29	28.2	103	100.0
LEFT Acetabulosciatic breadth	97	94.2	6	5.8	103	100.0
RIGHT Acetabulosciatic breadth	97	94.2	6	5.8	103	100.0
LEFT Ischium length	87	84.5	16	15.5	103	100.0
RIGHT Ischium length	93	90.3	10	9.7	103	100.0
LEFT Maximum length of obturator foramen	88	85.4	15	14.6	103	100.0
RIGHT Maximum length of obturator foramen	90	87.4	13	12.6	103	100.0
LEFT Maximum width of obturator foramen	87	84.5	16	15.5	103	100.0
RIGHT Maximum width of obturator foramen	90	87.4	13	12.6	103	100.0

Table 7.1(xvii) Case summary for innominate measurements for total sample (contd.)

Variable	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
LEFT Auricular surface profile - a	69	67.0	34	33.0	103	100.0
RIGHT Auricular surface profile - a	71	68.9	32	31.1	103	100.0
LEFT Auricular surface profile - b	70	68.0	13	32.0	103	100.0
RIGHT Auricular surface profile - b	72	69.9	11	30.1	103	100.0
LEFT Auricular surface profile - c	91	88.3	12	11.7	103	100.0
RIGHT Auricular surface profile - c	88	85.4	15	14.6	103	100.0
LEFT Auricular surface profile - d	69	67.0	34	33.0	103	100.0
RIGHT Auricular surface profile - d	67	65.0	36	35.0	103	100.0
LEFT Auricular surface profile - e	69	67.0	34	33.0	103	100.0
RIGHT Auricular surface profile - e	69	67.0	34	33.0	103	100.0
LEFT Auricular surface profile - f	69	67.0	34	33.0	103	100.0
RIGHT Auricular surface profile - f	66	64.1	37	35.9	103	100.0
LEFT Sciatic notch width	26	25.2	77	74.8	103	100.0
RIGHT Sciatic notch width	24	23.3	79	76.7	103	100.0
LEFT Sciatic notch height	23	22.3	80	77.7	103	100.0
RIGHT Sciatic notch height	23	22.3	80	77.7	103	100.0
LEFT Sciatic notch position	22	21.4	81	78.6	103	100.0
RIGHT Sciatic notch position	23	22.3	80	77.7	103	100.0

Table 7.1(xviii) Case summary for innominate measurements for female group

Variable	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
LEFT Maximum innominate length (cm)	55	88.7	7	11.3	62	100.0
RIGHT Maximum innominate length (cm)	57	91.9	5	8.1	62	100.0
LEFT Innominate breadth (cm)	46	74.2	16	25.8	62	100.0
RIGHT Innominate breadth (cm)	47	75.8	15	24.2	62	100.0
LEFT Iliac height	58	93.5	4	6.5	62	100.0
RIGHT Iliac height	58	93.5	4	6.5	62	100.0
LEFT Acetabulum diameter	54	87.1	8	12.9	62	100.0
RIGHT Acetabulum diameter	58	93.5	4	6.5	62	100.0
LEFT Pubis length	33	53.2	29	46.8	62	100.0
RIGHT Pubis length	38	61.3	24	38.7	62	100.0
LEFT Minimum height of inferior pubic ramus	49	79.0	13	21.0	62	100.0
RIGHT Minimum height of inferior pubic ramus	55	88.7	7	11.3	62	100.0
LEFT Oblique length of inferior pubic ramus	42	67.7	20	32.3	62	100.0
RIGHT Oblique length of inferior pubic ramus	46	74.2	16	25.8	62	100.0
LEFT Tubercolusymphyseal height	22	35.5	40	64.5	62	100.0
RIGHT Tubercolusymphyseal height	21	33.9	41	66.1	62	100.0
LEFT Pubic acetabular length	34	54.8	28	45.2	62	100.0
RIGHT Pubic acetabular length	38	61.3	24	38.7	62	100.0
LEFT Pubic tubercle-acetabular length	21	33.9	41	66.1	62	100.0
RIGHT Pubic tubercle-acetabular length	22	35.5	40	64.5	62	100.0
LEFT Ischial acetabular height	55	88.7	7	11.3	62	100.0
RIGHT Ischial acetabular height	55	88.7	7	11.3	62	100.0
LEFT Pubo-sacroiliac diameter	33	53.2	29	46.8	62	100.0
RIGHT Pubo-sacroiliac diameter	37	59.7	25	40.3	62	100.0
RIGHT Ischial acetabular height	55	88.7	7	11.3	62	100.0

Table 7.1(xviii) Case summary for innominate measurements for female group (contd.)

Variable	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
LEFT Pubic symphysis depth	35	56.5	27	43.5	62	100.0
RIGHT Pubic symphysis depth	38	61.3	24	38.7	62	100.0
LEFT Pubic symphysis superior width	35	56.5	27	43.5	62	100.0
RIGHT Pubic symphysis superior width	38	61.3	24	38.7	62	100.0
LEFT Pubic symphysis inferior width	35	56.5	27	43.5	62	100.0
RIGHT Pubic symphysis inferior width	37	59.7	25	40.3	62	100.0
LEFT Maximum width of pubic symphysis	37	59.7	25	40.3	62	100.0
RIGHT Maximum width of pubic symphysis	40	64.5	22	35.5	62	100.0
LEFT Ischial spine to symphysis	16	25.8	46	71.5	62	100.0
RIGHT Ischial spine to symphysis	11	17.7	51	82.3	62	100.0
LEFT Symphyseal angle	40	64.5	22	35.5	62	100.0
RIGHT Symphyseal angle	44	71.0	18	29.0	62	100.0
LEFT Acetabulosciatic breadth	60	96.8	2	3.2	62	100.0
RIGHT Acetabulosciatic breadth	59	95.2	3	4.8	62	100.0
LEFT Ischium length	54	87.1	8	12.9	62	100.0
RIGHT Ischium length	55	88.7	7	11.3	62	100.0
LEFT Maximum length of obturator foramen	53	85.5	9	14.5	62	100.0
RIGHT Maximum length of obturator foramen	57	91.9	5	8.1	62	100.0
LEFT Maximum width of obturator foramen	52	83.9	10	16.1	62	100.0
RIGHT Maximum width of obturator foramen	56	90.3	6	9.7	62	100.0

Table 7.1(xviii) Case summary for innominate measurements for female group (contd.)

Variable	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
LEFT Auricular surface profile - a	39	62.9	23	37.1	62	100.0
RIGHT Auricular surface profile - a	40	64.5	22	35.5	62	100.0
LEFT Auricular surface profile - b	39	62.9	23	37.1	62	100.0
RIGHT Auricular surface profile - b	41	66.1	21	33.9	62	100.0
LEFT Auricular surface profile - c	55	88.7	7	11.3	62	100.0
RIGHT Auricular surface profile - c	54	87.1	8	12.9	62	100.0
LEFT Auricular surface profile - d	39	62.9	23	37.1	62	100.0
RIGHT Auricular surface profile - d	37	59.7	25	40.3	62	100.0
LEFT Auricular surface profile - e	39	62.9	23	37.1	62	100.0
RIGHT Auricular surface profile - e	39	62.9	23	37.1	62	100.0
LEFT Auricular surface profile - f	39	62.9	23	37.1	62	100.0
RIGHT Auricular surface profile - f	37	59.7	25	40.3	62	100.0
LEFT Sciatic notch width	13	21.0	49	79.0	62	100.0
RIGHT Sciatic notch width	9	14.5	53	85.5	62	100.0
LEFT Sciatic notch height	10	16.1	42	83.9	62	100.0
RIGHT Sciatic notch height	9	14.5	53	85.5	62	100.0
LEFT Sciatic notch position	9	14.5	53	85.5	62	100.0
RIGHT Sciatic notch position	9	14.5	53	85.5	62	100.0

Table 7.1(xix) Case summary for innominate measurements for male group

Variable	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
LEFT Maximum innominate length (cm)	35	85.4	6	14.6	41	100.0
RIGHT Maximum innominate length (cm)	36	87.8	5	12.2	41	100.0
LEFT Innominate breadth (cm)	35	85.4	6	14.6	41	100.0
RIGHT Innominate breadth (cm)	34	82.9	7	17.1	41	100.0
LEFT Iliac height	38	92.7	3	7.3	41	100.0
RIGHT Iliac height	38	92.7	3	7.3	41	100.0
LEFT Acetabulum diameter	37	90.2	4	9.8	41	100.0
RIGHT Acetabulum diameter	37	90.2	4	9.8	41	100.0
LEFT Pubis length	28	68.3	13	32.7	41	100.0
RIGHT Pubis length	28	68.3	13	32.7	41	100.0
LEFT Minimum height of inferior pubic ramus	36	87.8	5	12.2	41	100.0
RIGHT Minimum height of inferior pubic ramus	36	87.8	5	12.2	41	100.0
LEFT Oblique length of inferior pubic ramus	34	82.9	7	17.1	41	100.0
RIGHT Oblique length of inferior pubic ramus	34	82.9	7	17.1	41	100.0
LEFT Tubercolusymphyseal height	24	58.5	17	41.5	41	100.0
RIGHT Tubercolusymphyseal height	22	53.7	19	46.3	41	100.0
LEFT Pubic acetabular length	29	70.7	12	29.3	41	100.0
RIGHT Pubic acetabular length	29	70.7	12	29.3	41	100.0
LEFT Pubic tubercle-acetabular length	24	58.5	17	41.5	41	100.0
RIGHT Pubic tubercle-acetabular length	22	53.7	19	46.3	41	100.0
LEFT Ischial acetabular height	35	85.4	6	14.6	41	100.0
RIGHT Ischial acetabular height	37	90.2	4	9.8	41	100.0
LEFT Pubo-sacroiliac diameter	27	65.9	14	34.1	41	100.0
RIGHT Pubo-sacroiliac diameter	27	65.9	14	34.1	41	100.0

Table 7.1(xix) Case summary for innominate measurements for male group (contd.)

Variable	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
LEFT Pubic symphysis depth	31	75.6	10	24.4	41	100.0
RIGHT Pubic symphysis depth	30	73.2	11	26.8	41	100.0
LEFT Pubic symphysis superior width	31	75.6	10	24.4	41	100.0
RIGHT Pubic symphysis superior width	30	73.2	11	26.8	41	100.0
LEFT Pubic symphysis inferior width	31	75.6	10	24.4	41	100.0
RIGHT Pubic symphysis inferior width	30	73.2	11	26.8	41	100.0
LEFT Maximum width of pubic symphysis	32	78.0	9	22.0	41	100.0
RIGHT Maximum width of pubic symphysis	29	70.7	12	29.3	41	100.0
LEFT Ischial spine to symphysis	14	34.1	27	65.9	41	100.0
RIGHT Ischial spine to symphysis	11	26.8	30	73.2	41	100.0
LEFT Symphyseal angle	31	75.6	10	24.4	41	100.0
RIGHT Symphyseal angle	30	73.2	11	26.8	41	100.0
LEFT Acetabulosciatic breadth	37	90.2	4	9.8	41	100.0
RIGHT Acetabulosciatic breadth	38	92.7	3	7.3	41	100.0
LEFT Ischium length	33	80.5	8	19.5	41	100.0
RIGHT Ischium length	38	92.7	3	7.3	41	100.0
LEFT Maximum length of obturator foramen	35	85.4	6	14.6	41	100.0
RIGHT Maximum length of obturator foramen	33	80.5	8	19.5	41	100.0
LEFT Maximum width of obturator foramen	35	85.4	6	14.6	41	100.0
RIGHT Maximum width of obturator foramen	34	82.9	7	17.1	41	100.0

Table 7.1(xix) Case summary for innominate measurements for male group (contd.)

Variable	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
LEFT Auricular surface profile - a	30	73.2	11	26.8	41	100.0
RIGHT Auricular surface profile - a	31	75.6	10	24.4	41	100.0
LEFT Auricular surface profile - b	31	75.6	10	24.4	41	100.0
RIGHT Auricular surface profile - b	31	75.6	10	24.4	41	100.0
LEFT Auricular surface profile - c	36	87.8	5	12.2	41	100.0
RIGHT Auricular surface profile - c	34	82.9	7	17.1	41	100.0
LEFT Auricular surface profile - d	30	73.2	11	26.8	41	100.0
RIGHT Auricular surface profile - d	30	73.2	11	26.8	41	100.0
LEFT Auricular surface profile - e	30	73.2	11	26.8	41	100.0
RIGHT Auricular surface profile - e	30	73.2	11	26.8	41	100.0
LEFT Auricular surface profile - f	30	73.2	11	26.8	41	100.0
RIGHT Auricular surface profile - f	29	70.7	12	29.3	41	100.0
LEFT Sciatic notch width	13	31.7	28	68.3	41	100.0
RIGHT Sciatic notch width	15	36.6	26	63.4	41	100.0
LEFT Sciatic notch height	13	31.7	28	68.3	41	100.0
RIGHT Sciatic notch height	14	34.1	27	65.9	41	100.0
LEFT Sciatic notch position	13	31.7	28	68.3	41	100.0
RIGHT Sciatic notch position	14	34.1	27	65.9	41	100.0

Table 7.1(xx) Case summary for reconstructed pelvis measurements for total sample

Variable	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
A-P superior diameter of pelvis	63	61.2	40	38.8	103	100.0
A-P inferior diameter of pelvis	40	38.8	63	61.2	103	100.0
Transverse diameter of pelvis	70	68.0	33	32.0	103	100.0
Greatest pelvic diameter	65	63.1	38	36.9	103	100.0
Bispinous breadth	18	17.5	85	82.5	103	100.0
Bi-tuberous diameter	64	62.1	39	37.9	103	100.0
Bi-tuberous width (cm)	64	62.1	39	37.9	103	100.0
Right ischial spine to sacral apex	15	14.6	88	85.4	103	100.0
Left ischial spine to sacral apex	24	23.3	79	76.7	103	100.0
Right ischial tuberosity to sacral apex	40	38.8	63	61.2	103	100.0
Left ischial tuberosity to sacral apex	38	36.9	65	63.1	103	100.0
Subpubic angle	65	63.1	38	36.9	103	100.0
Inlet circumference (cm)	59	57.3	44	42.7	103	100.0
Superior-anterior bi-iliac breadth of pelvis (cm)	61	59.2	42	40.8	103	100.0
Inferior-posterior bi-iliac breadth of pelvis	53	51.5	50	48.5	103	100.0
Bi-acetabular breadth	69	67.0	34	33.0	103	100.0

Table 7.1(xxi) Case summary for reconstructed pelvis measurements for female group

Variable	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
A-P superior diameter of pelvis	33	53.2	29	46.8	62	100.0
A-P inferior diameter of pelvis	21	33.9	41	66.1	62	100.0
Transverse diameter of pelvis	40	64.5	22	35.5	62	100.0
Greatest pelvic diameter	36	58.1	26	41.9	62	100.0
Bispinous breadth	7	11.3	55	88.7	62	100.0
Bi-tuberous diameter	37	59.7	25	40.3	62	100.0
Bi-tuberous width (cm)	37	59.7	25	40.3	62	100.0
Right ischial spine to sacral apex	6	9.7	56	90.3	62	100.0
Left ischial spine to sacral apex	12	19.4	50	80.6	62	100.0
Right ischial tuberosity to sacral apex	21	33.9	41	66.1	62	100.0
Left ischial tuberosity to sacral apex	20	32.3	42	67.7	62	100.0
Subpubic angle	36	58.1	26	41.9	62	100.0
Inlet circumference (cm)	33	53.2	29	46.8	62	100.0
Superior-anterior bi-iliac breadth of pelvis (cm)	33	53.2	29	46.8	62	100.0
Inferior-posterior bi-iliac breadth of pelvis	27	43.5	35	56.5	62	100.0
Bi-acetabular breadth	38	61.3	24	38.7	62	100.0

Table 7.1(xxii) Case summary for reconstructed pelvis measurements for male group

Variable	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
A-P superior diameter of pelvis	30	73.2	11	26.8	41	100.0
A-P inferior diameter of pelvis	19	46.3	22	53.7	41	100.0
Transverse diameter of pelvis	30	73.2	11	26.8	41	100.0
Greatest pelvic diameter	29	70.7	12	29.3	41	100.0
Bispinous breadth	11	26.8	30	73.2	41	100.0
Bi-tuberous diameter	27	65.9	14	34.1	41	100.0
Bi-tuberous width (cm)	27	65.9	14	34.1	41	100.0
Right ischial spine to sacral apex	9	22.0	32	78.0	41	100.0
Left ischial spine to sacral apex	12	29.3	29	70.7	41	100.0
Right ischial tuberosity to sacral apex	19	46.3	22	53.7	41	100.0
Left ischial tuberosity to sacral apex	18	43.9	23	56.1	41	100.0
Subpubic angle	29	70.7	12	29.3	41	100.0
Inlet circumference (cm)	26	63.4	15	36.6	41	100.0
Superior-anterior bi-iliac breadth of pelvis (cm)	28	68.3	13	31.7	41	100.0
Inferior-posterior bi-iliac breadth of pelvis	26	63.4	15	36.6	41	100.0
Bi-acetabular breadth	31	75.6	10	24.4	41	100.0

Table 7.1(xxiii)Case summary for femoral measurements for total sample

Variable	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
LEFT Femur length (cm)	76	73.8	27	26.2	103	100
RIGHT Femur length (cm)	96	93.2	7	6.8	103	100

Table 7.1(xxiv) Case summary for femoral measurements for female group

Variable	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
LEFT Femur length (cm)	49	79.0	13	21.0	62	100
RIGHT Femur length (cm)	58	93.5	4	6.5	62	100

Table 7.1(xxv) Case summary for femoral measurements for male group

Variable	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
LEFT Femur length (cm)	27	65.9	14	34.1	41	100
RIGHT Femur length (cm)	38	92.7	3	7.3	41	100

Appendix 5

Kolmogorov-Smirnov tests of normality

Table 7.2(i) Kolmogorov-Smirnov test of normality for age at death in the total sample and female and male groups

Age at death	Kolmogorov-Smirnov Statistic	Degrees of freedom	p value	Normal distribution
Total sample	.097	103	.018	✗
Female group	.090	62	.200	✓
Male group	.154	41	.016	✗

Table 7.2(ii) Kolmogorov-Smirnov test of normality for sacral measurements of the total sample

Variable	Kolmogorov-Smirnov Statistic	Degrees of freedom	p value	Normal distribution
Maximum superior sacral width	.071	97	.200	✓
Maximum inferior sacral width	.084	83	.200	✓
Maximum transverse diameter of S1	.091	75	.200	✓
Maximum A-P diameter of S1	.053	90	.200	✓
Height of body of first sacral vertebra	.084	72	.200	✓
Promontorium angle	.086	92	.092	✓
Mid-ventral curved length	.100	55	.200	✓
Distance of medial borders of processus articulares superiores	.061	95	.200	✓
Distance of lateral borders of processus articulares superiores	.055	91	.200	✓
Spinal canal maximum transverse width	.075	98	.200	✓
Spinal canal maximum A-P width	.191	8	.200	✓
Combined transverse width of alae	.059	71	.200	✓
Anterior mid-ventral straight height of sacrum	.098	58	.200	✓
Maximum depth of curvature of sacrum	.057	48	.200	✓
Position of maximum depth of curvature of sacrum	.117	48	.097	✓

Table 7.2(iii) Kolmogorov-Smirnov test of normality for innominate measurements of the total sample

Variable	Kolmogorov-Smirnov Statistic	Degrees of freedom	p value	Normal distribution
LEFT Maximum innominate length (cm)	.068	90	.200	✓
RIGHT Maximum innominate length (cm)	.066	93	.200	✓
LEFT Innominate breadth (cm)	.062	81	.200	✓
RIGHT Innominate breadth (cm)	.069	81	.200	✓
LEFT Iliac height	.057	96	.200	✓
RIGHT Iliac height	.060	96	.200	✓
LEFT Acetabulum diameter	.091	91	.058	✓
RIGHT Acetabulum diameter	.080	95	.159	✓
LEFT Pubis length	.076	61	.200	✓
RIGHT Pubis length	.096	66	.200	✓
LEFT Minimum height of inferior pubic ramus	.075	85	.200	✓
RIGHT Minimum height of inferior pubic ramus	.058	91	.200	✓
LEFT Oblique length of inferior pubic ramus	.044	76	.200	✓
RIGHT Oblique length of inferior pubic ramus	.061	80	.200	✓
LEFT Tubercolusymphyseal height	.089	46	.200	✓
RIGHT Tubercolusymphyseal height	.114	43	.184	✓
LEFT Pubic acetabular length	.070	63	.200	✓
RIGHT Pubic acetabular length	.077	67	.200	✓
LEFT Pubic tubercle-acetabular length	.095	45	.200	✓
RIGHT Pubic tubercle-acetabular length	.099	44	.200	✓
LEFT Ischial acetabular height	.076	90	.200	✓
RIGHT Ischial acetabular height	.094	93	.040	✗
LEFT Pubo-sacroiliac diameter	.093	60	.200	✓
RIGHT Pubo-sacroiliac diameter	.101	64	.173	✓

Table 7.2(iii) Kolmogorov-Smirnov test of normality for innominate measurements of the total sample (contd.)

Variable	Kolmogorov-Smirnov Statistic	Degrees of freedom	p value	Normal distribution
LEFT Pubic symphysis depth	.093	66	.200	✓
RIGHT Pubic symphysis depth	.051	68	.200	✓
LEFT Pubic symphysis superior width	.079	66	.200	✓
RIGHT Pubic symphysis superior width	.111	68	.038	✗
LEFT Pubic symphysis inferior width	.072	66	.200	✓
RIGHT Pubic symphysis inferior width	.066	67	.200	✓
LEFT Maximum width of pubic symphysis	.099	69	.088	✓
RIGHT Maximum width of pubic symphysis	.067	69	.200	✓
LEFT Ischial spine to symphysis	.114	30	.200	✓
RIGHT Ischial spine to symphysis	.145	22	.200	✓
LEFT Symphyseal angle	.120	71	.012	✗
RIGHT Symphyseal angle	.121	74	.009	✗
LEFT Acetabulosciatic breadth	.044	97	.200	✓
RIGHT Acetabulosciatic breadth	.118	97	.002	✗
LEFT Ischium length	.072	87	.200	✓
RIGHT Ischium length	.061	93	.200	✓
LEFT Maximum length of obturator foramen	.061	88	.200	✓
RIGHT Maximum length of obturator foramen	.051	90	.200	✓
LEFT Maximum width of obturator foramen	.069	87	.200	✓
RIGHT Maximum width of obturator foramen	.052	90	.200	✓

Table 7.2(iii) Kolmogorov-Smirnov test of normality for innominate measurements of the total sample (contd.)

Variable	Kolmogorov-Smirnov Statistic	Degrees of freedom	p value	Normal distribution
LEFT Auricular surface profile - a	.103	69	.066	✓
RIGHT Auricular surface profile - a	.095	71	.181	✓
LEFT Auricular surface profile - b	.118	70	.018	✗
RIGHT Auricular surface profile - b	.095	72	.183	✓
LEFT Auricular surface profile - c	.069	91	.200	✓
RIGHT Auricular surface profile - c	.093	88	.060	✓
LEFT Auricular surface profile - d	.061	69	.200	✓
RIGHT Auricular surface profile - d	.062	67	.200	✓
LEFT Auricular surface profile - e	.087	69	.200	✓
RIGHT Auricular surface profile - e	.103	69	.067	✓
LEFT Auricular surface profile - f	.094	69	.200	✓
RIGHT Auricular surface profile - f	.068	66	.200	✓
LEFT Sciatic notch width	.109	26	.200	✓
RIGHT Sciatic notch width	.166	24	.086	✓
LEFT Sciatic notch height	.216	23	.007	✗
RIGHT Sciatic notch height	.120	23	.200	✓
LEFT Sciatic notch position	.155	22	.183	✓
RIGHT Sciatic notch position	.116	23	.200	✓

Table 7.2(iv) Kolmogorov-Smirnov test of normality for reconstructed pelvic measurements of the total sample

Variable	Kolmogorov-Smirnov Statistic	Degrees of freedom	p value	Normal distribution
A-P superior diameter of pelvis	.069	63	.200	✓
A-P inferior diameter of pelvis	.122	40	.138	✓
Transverse diameter of pelvis	.055	70	.200	✓
Greatest pelvic diameter	.096	65	.200	✓
Bispinous breadth	.147	18	.200	✓
Bi-tuberous diameter	.062	64	.200	✓
Bi-tuberous width (cm)	.076	64	.200	✓
Right ischial spine to sacral apex	.167	15	.200	✓
Left ischial spine to sacral apex	.116	24	.200	✓
Right ischial tuberosity to sacral apex	.152	40	.020	✗
Left ischial tuberosity to sacral apex	.120	38	.186	✓
Subpubic angle	.065	65	.200	✓
Inlet circumference (cm)	.079	59	.200	✓
Superior-anterior bi-iliac breadth of pelvis (cm)	.101	61	.200	✓
Inferior-posterior bi-iliac breadth of pelvis	.078	53	.200	✓
Bi-acetabular breadth	.060	69	.200	✓

Table 7.2(v) Kolmogorov-Smirnov test of normality for the femoral measurements of the total sample

Measurement	Kolmogorov-Smirnov Statistic	Degrees of freedom	p value	Normal distribution
LEFT femur	.070	76	.200	✓
RIGHT femur	.072	96	.200	✓

Table 7.2(vi) Kolmogorov-Smirnov test of normality for sacral measurements of the female group

Variable	Kolmogorov-Smirnov Statistic	Degrees of freedom	p value	Normal distribution
Maximum superior sacral width	.064	58	.200	✓
Maximum inferior sacral width	.098	45	.200	✓
Maximum transverse diameter of S1	.114	44	.187	✓
Maximum A-P diameter of S1	.080	56	.200	✓
Height of body of first sacral vertebra	.143	42	.031	✗
Promontorium angle	.097	57	.200	✓
Mid-ventral curved length	.121	28	.200	✓
Distance of medial borders of processus articulares superiores	.095	54	.200	✓
Distance of lateral borders of processus articulares superiores	.077	53	.200	✓
Spinal canal maximum transverse width	.095	57	.200	✓
Spinal canal maximum A-P width	.250	4	<.001	✗
Combined transverse width of alae	.100	42	.200	✓
Anterior mid-ventral straight height of sacrum	.180	30	.014	✗
Maximum depth of curvature of sacrum	.137	27	.200	✓
Position of maximum depth of curvature of sacrum	.159	27	.077	✓

Table 7.2(vii) Kolmogorov-Smirnov test of normality for innominate measurements of the female group

Variable	Kolmogorov-Smirnov Statistic	Degrees of freedom	p value	Normal distribution
LEFT Maximum innominate length (cm)	.106	55	.184	✓
RIGHT Maximum innominate length (cm)	.074	57	.200	✓
LEFT Innominate breadth (cm)	.117	46	.130	✓
RIGHT Innominate breadth (cm)	.093	47	.200	✓
LEFT Iliac height	.096	58	.200	✓
RIGHT Iliac height	.052	58	.200	✓
LEFT Acetabulum diameter	.090	54	.200	✓
RIGHT Acetabulum diameter	.075	58	.200	✓
LEFT Pubis length	.066	33	.200	✓
RIGHT Pubis length	.097	38	.200	✓
LEFT Minimum height of inferior pubic ramus	.097	49	.200	✓
RIGHT Minimum height of inferior pubic ramus	.075	55	.200	✓
LEFT Oblique length of inferior pubic ramus	.074	42	.200	✓
RIGHT Oblique length of inferior pubic ramus	.109	46	.200	✓
LEFT Tubercolusymphyseal height	.122	22	.200	✓
RIGHT Tubercolusymphyseal height	.146	21	.200	✓
LEFT Pubic acetabular length	.107	34	.200	✓
RIGHT Pubic acetabular length	.103	38	.200	✓
LEFT Pubic tubercle-acetabular length	.128	21	.200	✓
RIGHT Pubic tubercle-acetabular length	.108	22	.200	✓
LEFT Ischial acetabular height	.072	55	.200	✓
RIGHT Ischial acetabular height	.121	56	.040	✗
LEFT Pubo-sacroiliac diameter	.097	33	.200	✓
RIGHT Pubo-sacroiliac diameter	.118	37	.200	✓

Table 7.2(vii) Kolmogorov-Smirnov test of normality for innominate measurements of the female group (contd.)

Variable	Kolmogorov-Smirnov Statistic	Degrees of freedom	p value	Normal distribution
LEFT Pubic symphysis depth	.125	35	.185	✓
RIGHT Pubic symphysis depth	.068	38	.200	✓
LEFT Pubic symphysis superior width	.111	35	.200	✓
RIGHT Pubic symphysis superior width	.138	38	.066	✓
LEFT Pubic symphysis inferior width	.117	35	.200	✓
RIGHT Pubic symphysis inferior width	.112	37	.200	✓
LEFT Maximum width of pubic symphysis	.107	37	.200	✓
RIGHT Maximum width of pubic symphysis	.089	40	.200	✓
LEFT Ischial spine to symphysis	.192	16	.118	✓
RIGHT Ischial spine to symphysis	.185	11	.200	✓
LEFT Symphyseal angle	.083	40	.200	✓
RIGHT Symphyseal angle	.145	44	.020	✗
LEFT Acetabulosciatic breadth	.062	60	.200	✓
RIGHT Acetabulosciatic breadth	.173	59	<.001	✗
LEFT Ischium length	.106	54	.197	✓
RIGHT Ischium length	.062	55	.200	✓
LEFT Maximum length of obturator foramen	.112	53	.093	✓
RIGHT Maximum length of obturator foramen	.074	57	.200	✓
LEFT Maximum width of obturator foramen	.143	52	.010	✗
RIGHT Maximum width of obturator foramen	.101	56	.200	✓

Table 7.2(vii) Kolmogorov-Smirnov test of normality for innominate measurements of the female group (contd.)

Variable	Kolmogorov-Smirnov Statistic	Degrees of freedom	p value	Normal distribution
LEFT Auricular surface profile - a	.121	39	.155	✓
RIGHT Auricular surface profile - a	.126	40	.110	✓
LEFT Auricular surface profile - b	.127	39	.113	✓
RIGHT Auricular surface profile - b	.102	41	.200	✓
LEFT Auricular surface profile - c	.153	55	.003	✗
RIGHT Auricular surface profile - c	.119	54	.056	✓
LEFT Auricular surface profile - d	.098	39	.200	✓
RIGHT Auricular surface profile - d	.111	37	.200	✓
LEFT Auricular surface profile - e	.106	39	.200	✓
RIGHT Auricular surface profile - e	.104	39	.200	✓
LEFT Auricular surface profile - f	.144	39	.041	✗
RIGHT Auricular surface profile - f	.126	37	.146	✓
LEFT Sciatic notch width	.146	13	.200	✓
RIGHT Sciatic notch width	.290	9	.028	✗
LEFT Sciatic notch height	.360	10	.001	✗
RIGHT Sciatic notch height	.190	9	.200	✓
LEFT Sciatic notch position	.141	9	.200	✓
RIGHT Sciatic notch position	.169	9	.200	✓

Table 7.2(viii) Kolmogorov-Smirnov test of normality for reconstructed pelvic measurements of the female group

Variable	Kolmogorov-Smirnov Statistic	Degrees of freedom	p value	Normal distribution
A-P superior diameter of pelvis	.060	33	.200	✓
A-P inferior diameter of pelvis	.175	21	.094	✓
Transverse diameter of pelvis	.103	40	.200	✓
Greatest pelvic diameter	.177	36	.006	✗
Bispinous breadth	.149	7	.200	✓
Bi-tuberous diameter	.087	37	.200	✓
Bi-tuberous width (cm)	.118	37	.200	✓
Right ischial spine to sacral apex	.186	6	.200	✓
Left ischial spine to sacral apex	.170	12	.200	✓
Right ischial tuberosity to sacral apex	.227	21	.006	✗
Left ischial tuberosity to sacral apex	.173	20	.117	✓
Subpubic angle	.103	36	.200	✓
Inlet circumference (cm)	.107	33	.200	✓
Superior-anterior bi-iliac breadth of pelvis (cm)	.089	33	.200	✓
Inferior-posterior bi-iliac breadth of pelvis	.095	27	.200	✓
Bi-acetabular breadth	.107	38	.200	✓

Table 7.2(ix) Kolmogorov-Smirnov test of normality for the femoral measurements of the female group

Measurement	Kolmogorov-Smirnov Statistic	Degrees of freedom	p value	Normal distribution
LEFT femur	.086	49	.200	✓
RIGHT femur	.102	58	.200	✓

Table 7.2(x) Kolmogorov-Smirnov test of normality for sacral measurements of the male group

Variable	Kolmogorov-Smirnov Statistic	Degrees of freedom	p value	Normal distribution
Maximum superior sacral width	.132	39	.082	✓
Maximum inferior sacral width	.102	38	.200	✓
Maximum transverse diameter of S1	.102	31	.200	✓
Maximum A-P diameter of S1	.093	34	.200	✓
Height of body of first sacral vertebra	.110	30	.200	✓
Promontorium angle	.132	35	.130	✓
Mid-ventral curved length	.113	27	.200	✓
Distance of medial borders of processus articulares superiores	.082	41	.200	✓
Distance of lateral borders of processus articulares superiores	.105	38	.200	✓
Spinal canal maximum transverse width	.078	41	.200	✓
Spinal canal maximum A-P width	.220	4	<.001	✗
Combined transverse width of alae	.102	29	.200	✓
Anterior mid-ventral straight height of sacrum	.098	28	.200	✓
Maximum depth of curvature of sacrum	.140	21	.200	✓
Position of maximum depth of curvature of sacrum	.152	21	.200	✓

Table 7.2(xi) Kolmogorov-Smirnov test of normality for innominate measurements of the male group

Variable	Kolmogorov-Smirnov Statistic	Degrees of freedom	p value	Normal distribution
LEFT Maximum innominate length (cm)	.103	35	.200	✓
RIGHT Maximum innominate length (cm)	.112	36	.200	✓
LEFT Innominate breadth (cm)	.085	35	.200	✓
RIGHT Innominate breadth (cm)	.114	34	.200	✓
LEFT Iliac height	.084	38	.200	✓
RIGHT Iliac height	.111	38	.200	✓
LEFT Acetabulum diameter	.169	37	.009	✗
RIGHT Acetabulum diameter	.100	37	.200	✓
LEFT Pubis length	.175	28	.027	✗
RIGHT Pubis length	.143	28	.146	✓
LEFT Minimum height of inferior pubic ramus	.101	36	.200	✓
RIGHT Minimum height of inferior pubic ramus	.112	36	.200	✓
LEFT Oblique length of inferior pubic ramus	.079	34	.200	✓
RIGHT Oblique length of inferior pubic ramus	.100	34	.200	✓
LEFT Tubercolusymphyseal height	.108	24	.200	✓
RIGHT Tubercolusymphyseal height	.126	22	.200	✓
LEFT Pubic acetabular length	.119	29	.200	✓
RIGHT Pubic acetabular length	.156	29	.069	✓
LEFT Pubic tubercle-acetabular length	.137	24	.200	✓
RIGHT Pubic tubercle-acetabular length	.156	22	.174	✓
LEFT Pubic tubercle-acetabular length	.156	22	.174	✓
RIGHT Ischial acetabular height	.101	35	.200	✓
RIGHT Ischial acetabular height	.076	37	.200	✓
LEFT Pubo-sacroiliac diameter	.131	27	.200	✓
RIGHT Pubo-sacroiliac diameter	.128	27	.200	✓

Table 7.2(xi) Kolmogorov-Smirnov test of normality for innominate measurements of the male group (contd.)

Variable	Kolmogorov-Smirnov Statistic	Degrees of freedom	p value	Normal distribution
LEFT Pubic symphysis depth	.119	31	.200	✓
RIGHT Pubic symphysis depth	.098	30	.200	✓
LEFT Pubic symphysis superior width	.139	31	.131	✓
RIGHT Pubic symphysis superior width	.113	30	.200	✓
LEFT Pubic symphysis inferior width	.137	31	.147	✓
RIGHT Pubic symphysis inferior width	.085	30	.200	✓
LEFT Maximum width of pubic symphysis	.097	32	.200	✓
RIGHT Maximum width of pubic symphysis	.140	29	.152	✓
LEFT Ischial spine to symphysis	.126	14	.200	✓
RIGHT Ischial spine to symphysis	.207	11	.200	✓
LEFT Symphyseal angle	.135	31	.157	✓
RIGHT Symphyseal angle	.126	30	.200	✓
LEFT Acetabulosciatic breadth	.100	37	.200	✓
RIGHT Acetabulosciatic breadth	.085	38	.200	✓
LEFT Ischium length	.085	33	.200	✓
RIGHT Ischium length	.080	38	.200	✓
LEFT Maximum length of obturator foramen	.114	35	.200	✓
RIGHT Maximum length of obturator foramen	.081	33	.200	✓
LEFT Maximum width of obturator foramen	.135	35	.109	✓
RIGHT Maximum width of obturator foramen	.135	34	.123	✓

Table 7.2(xi) Kolmogorov-Smirnov test of normality for innominate measurements of the male group (contd.)

Variable	Kolmogorov-Smirnov Statistic	Degrees of freedom	p value	Normal distribution
LEFT Auricular surface profile - a	.100	30	.200	✓
RIGHT Auricular surface profile - a	.087	31	.200	✓
LEFT Auricular surface profile - b	.094	31	.200	✓
RIGHT Auricular surface profile - b	.098	31	.200	✓
LEFT Auricular surface profile - c	.080	36	.200	✓
RIGHT Auricular surface profile - c	.100	34	.200	✓
LEFT Auricular surface profile - d	.089	30	.200	✓
RIGHT Auricular surface profile - d	.084	30	.200	✓
LEFT Auricular surface profile - e	.086	30	.200	✓
RIGHT Auricular surface profile - e	.144	30	.112	✓
LEFT Auricular surface profile - f	.086	30	.200	✓
RIGHT Auricular surface profile - f	.096	29	.200	✓
LEFT Sciatic notch width	.168	13	.200	✓
RIGHT Sciatic notch width	.143	15	.200	✓
LEFT Sciatic notch height	.136	13	.200	✓
RIGHT Sciatic notch height	.175	14	.200	✓
LEFT Sciatic notch position	.158	13	.200	✓
RIGHT Sciatic notch position	.177	14	.200	✓

Table 7.2(xii) Kolmogorov-Smirnov test of normality for reconstructed pelvic measurements of the male group

Variable	Kolmogorov-Smirnov Statistic	Degrees of freedom	p value	Normal distribution
A-P superior diameter of pelvis	.117	30	.200	✓
A-P inferior diameter of pelvis	.198	19	.049	✗
Transverse diameter of pelvis	.124	30	.200	✓
Greatest pelvic diameter	.117	29	.200	✓
Bispinous breadth	.151	11	.200	✓
Bi-tuberos diameter	.131	27	.200	✓
Bi-tuberos width (cm)	.088	27	.200	✓
Right ischial spine to sacral apex	.114	9	.200	✓
Left ischial spine to sacral apex	.176	12	.200	✓
Right ischial tuberosity to sacral apex	.206	19	.034	✗
Left ischial tuberosity to sacral apex	.179	18	.131	✓
Subpubic angle	.099	29	.200	✓
Inlet circumference (cm)	.179	26	.032	✗
Superior-anterior bi-iliac breadth of pelvis (cm)	.162	28	.057	✓
Inferior-posterior bi-iliac breadth of pelvis	.124	26	.200	✓
Bi-acetabular breadth	.083	31	.200	✓

Table 7.2(xiii) Kolmogorov-Smirnov test of normality for the femoral measurements of the male group

Measurement	Kolmogorov-Smirnov Statistic	Degrees of freedom	p value	Normal distribution
LEFT femur	.090	27	.200	✓
RIGHT femur	.101	38	.200	✓

Appendix 6

Tests of differences between two independent samples

Table 7.3(viii) Independent samples t-test comparing means of female and male for sacral measurements

Variable	t-test for equality of means*			Difference in means	Eta squared
	t	df	p value		
Maximum superior sacral width	2.245	95	.027	Yes	0.0504 (5.04%)
Maximum inferior sacral width	.698	81	.487	No	0.0059 (0.59%)
Maximum transverse diameter of S1	-7.515	73	<.001	Yes	0.4362 (43.62%)
Maximum A-P diameter of S1	-6.179	88	<.001	Yes	0.3026 (30.26%)
Promontorium angle	-.870	90	.387	No	0.0083 (0.83%)
Mid-ventral curved length (cm)	-2.487	53	.016	Yes	0.1045 (10.45%)
Distance of medial borders of processus articulares superiores	-1.456	93	.149	No	0.0223 (2.23%)
Distance of lateral borders of processus articulares superiores	-2.905	89	.005	Yes	0.0866 (8.66%)
Spinal canal maximum transverse width	-1.624	96	.108	No	0.0267 (2.67%)
Combined transverse width of alae	7.063	69	<.001	Yes	0.4196 (41.96%)
Maximum depth of curvature of sacrum	-2.774	46	.008	Yes	0.1433 (14.33%)
Position of maximum depth of curvature of sacrum	-1.521	46	.135	No	0.0479 (4.79%)

Table 7.3(ix) Mann-Whitney U test comparing medians of female and male for sacral measurements

Variable	Mann-Whitney U test**		Difference in medians
	z	p value	
Height of body of 1st sacral vertebra	-3.164	.002	Yes
Anterior mid ventral straight height of sacrum	-1.307	.191	No

Key:

** $H_0 \quad \theta_d = 0$ $H_1 \quad \theta_d \neq 0$ (Two-tailed test)

Table 7.3(x) Independent samples t-test comparing means of female and male for innominate measurements

Variable	t-test for equality of means*			Difference in means	Eta squared
	t	df	p value		
LEFT Maximum innominate length (cm)	-9.437	88	<.001	Yes	0.5030 (50.30%)
RIGHT Maximum innominate length (cm)	-10.492	91	<.001	Yes	0.5474 (54.74%)
LEFT Innominate breadth (cm)	-2.604	79	.011	Yes	0.0790 (7.90%)
RIGHT Innominate breadth (cm)	-2.837	79	.006	Yes	0.0925 (9.25%)
LEFT Iliac height	-7.331	94	<.001	Yes	0.3638 (36.38%)
RIGHT Iliac height	-7.463	94	<.001	Yes	0.3721 (37.21%)
RIGHT Acetabulum diameter	-9.951	93	<.001	Yes	0.5157 (51.57)
RIGHT Pubis length	.690	64	.493	Yes	0.0074 (0.74%)
LEFT Minimum height of inferior pubic ramus	-9.504	83	<.001	Yes	0.5211 (52.11%)
RIGHT Minimum height of inferior pubic ramus	-8.321	89	<.001	Yes	0.4376 (43.76%)
LEFT Oblique length of inferior pubic ramus	5.701	74	<.001	Yes	0.3052 (30.52%)
RIGHT Oblique length of inferior pubic ramus	4.590	78	<.001	Yes	0.2127 (21.27%)
LEFT Tubercolusymphyseal height	3.071	44	.004	Yes	0.1765 (17.65%)
RIGHT Tubercolusymphyseal height	3.430	41	.001	Yes	0.2230 (22.30%)
LEFT Pubic acetabular length	1.903	61	.062	No	0.0560 (5.60%)
RIGHT Pubic acetabular length	1.032	65	.306	No	0.0161 (1.61%)
LEFT Pubic tubercle-acetabular length	-2.375	43	.022	Yes	0.1160 (11.60%)
RIGHT Pubic tubercle-acetabular length	-3.176	42	.003	Yes	0.1937 (19.37%)
LEFT Ischial acetabular height	-11.093	88	<.001	Yes	0.5830 (58.30)

Key:

* $H_0 \quad \bar{x}_d = 0$ $H_1 \quad \bar{x}_d \neq 0$ (Two-tailed test)

Table 7.3(x) Independent samples t-test comparing means of female and male for innominate measurements (contd.)

Variable	t-test for equality of means*			Difference in means	Eta squared
	t	df	p value		
LEFT Pubo-sacroiliac diameter	2.008 [†]	57.082	.049	Yes	0.0660 (6.60%)
RIGHT Pubo-sacroiliac diameter	1.214 [†]	61.995	.229	No	0.0232 (2.32%)
LEFT Pubic symphysis depth	-5.477	64	<.001	Yes	0.3191 (31.91%)
RIGHT Pubic symphysis depth	5.265	66	<.001	Yes	0.2958 (29.58%)
LEFT Pubic symphysis superior width	-6.300	64	<.001	Yes	0.3828 (38.28%)
RIGHT Pubic symphysis superior width	-6.218	66	<.001	Yes	0.3694 (36.94%)
LEFT Pubic symphysis inferior width	-6.366	64	<.001	Yes	0.3877 (38.77%)
RIGHT Pubic symphysis inferior width	-6.276	65	<.001	Yes	0.3773 (37.73%)
LEFT Maximum width of pubic symphysis	-6.303	67	<.001	Yes	0.3722 (37.22%)
RIGHT Maximum width of pubic symphysis	-6.430	67	<.001	Yes	0.3816 (38.16%)
LEFT Ischial spine to symphysis	-.247	28	.807	No	0.0022 (0.22%)
RIGHT Ischial spine to symphysis	.360	20	.723	No	0.0064 (0.64%)
LEFT Symphyseal angle	-5.451	69	<.001	Yes	0.3010 (30.10%)
LEFT Acetabulosciatic breadth	-7.451	95	<.001	Yes	0.3688 (36.88%)
LEFT Ischium length	-8.944	85	<.001	Yes	0.4848 (48.48%)
RIGHT Ischium length	-8.798	91	<.001	Yes	0.4596 (45.96%)
LEFT Maximum length of obturator foramen	-7.127	86	<.001	Yes	0.3713 (37.13%)
RIGHT Maximum length of obturator foramen	-6.689	88	<.001	Yes	0.3371 (33.71%)
RIGHT Maximum width of obturator foramen	-.120	88	.905	No	0.0002 (0.02%)

Key:

† Equal variances not assumed
 * $H_0 \bar{x}_d = 0$ $H_1 \bar{x}_d \neq 0$ (Two-tailed test)

Table 7.3(x) Independent samples t-test comparing means of female and male for innominate measurements (contd.)

Variable	t-test for equality of means*			Difference in means	Eta squared
	t	df	p value		
LEFT Auricular surface profile - a	-4.347	67	<.001	Yes	0.2200 (22.00%)
RIGHT Auricular surface profile - a	-4.804	69	<.001	Yes	0.2506 (25.06%)
LEFT Auricular surface profile - b	-4.820	68	<.001	Yes	0.2547 (25.47%)
RIGHT Auricular surface profile - b	-5.571	70	<.001	Yes	0.3072 (30.72%)
RIGHT Auricular surface profile - c	-.511	86	.611	No	0.0030 (0.30%)
LEFT Auricular surface profile - d	-3.914	67	<.001	Yes	0.1861 (18.61%)
RIGHT Auricular surface profile - d	-3.995	65	<.001	Yes	0.1971 (19.71%)
LEFT Auricular surface profile - e	-.449	67	.655	No	0.0030 (0.30%)
RIGHT Auricular surface profile - e	-.540	67	.591	No	0.0043 (0.43%)
RIGHT Auricular surface profile - f	-.763	64	.448	No	0.0090 (0.90%)
LEFT Sciatic notch width	2.696	24	.013	Yes	0.2325 (23.25%)
RIGHT Sciatic notch height	-1.885 [†]	18.730	.075	No	0.1595 (15.95%)
LEFT Sciatic notch position	-2.247	20	.036	Yes	0.2016 (20.16%)
RIGHT Sciatic notch position	-1.796	21	.087	No	0.1331 (13.31%)

Key:

† Equal variances not assumed

* $H_0 \bar{x}_d = 0$ $H_1 \bar{x}_d \neq 0$ (Two-tailed test)

Table 7.3(xi) Mann-Whitney U test comparing medians of female and male for innominate measurements

Variable	Mann-Whitney U test*		Difference in medians
	z	p value	
LEFT Acetabulum diameter	-6.727	<.001	Yes
LEFT Pubis length	-1.643	.100	No
RIGHT Ischial acetabular height	-7.810	<.001	Yes
RIGHT Symphyseal angle	-6.147	<.001	Yes
RIGHT Acetabulosciatic breadth	-5.136	<.001	Yes
LEFT Maximum width of obturator foramen	-1.389	.165	No
LEFT Auricular surface profile - c	-1.911	.056	No
LEFT Auricular surface profile - f	-.999	.318	No
RIGHT Sciatic notch width	-.527	.598	No
LEFT Sciatic notch height	-.372	.710	No

Key:

* $H_0 \quad \bar{x}_d = 0$ $H_1 \quad \bar{x}_d \neq 0$ (Two-tailed test)

Table 7.3(xiv) Independent samples t-test for comparing means of female and male femoral measurements

Variable	t-test for equality of means*			Difference in means	Eta squared
	t	df	p value		
LEFT femur	-5.103	74	<.001	Yes	0.2603 (26.03%)
RIGHT femur	-5.019	94	<.001	Yes	0.2113 (21.13%)

Key:

- † Equal variances not assumed
- * $H_0: \bar{x}_d = 0$ $H_1: \bar{x}_d \neq 0$ (Two-tailed test)

Appendix 7

Tests of correlation between age and individual measurements

7.5.1(ii) Test of association between age and sacral measurements by sample/group (Spearman’s Rank Order Correlation)

Variable	Sample	Spearman’s Rank Order correlation coefficient			Coefficient of determination
		r _s	n	p value	
Maximum superior sacral width	Total	.179	97	.080	0.0320 (3.20%)
	Female	.281*	58	.033	0.0790 (7.90%)
	Male	.018	39	.913	0.0003 (0.03%)
Maximum inferior sacral width	Total	.222*	83	.044	0.0493 (4.93%)
	Female	.310*	45	.038	0.0961 (9.61%)
	Male	.108	38	.518	0.0117 (1.17%)
Maximum transverse diameter of S1	Total	.180	75	.121	0.0324 (3.24%)
	Female	.211	44	.169	0.0445 (4.45%)
	Male	-.049	31	.795	0.0024 (0.24%)
Maximum A-P diameter of S1	Total	.309**	90	.003	0.0955 (9.55%)
	Female	.435**	56	.001	0.1892 (18.92%)
	Male	.115	34	.517	0.0132 (1.32%)
Height of body of 1 st sacral vertebra	Total	.140	72	.240	0.0196 (1.96%)
	Female	.071	42	.657	0.0050 (0.50%)
	Male	.197	30	.297	0.0388 (3.88%)
Promontorium angle	Total	-.058	92	.581	0.0034 (0.34%)
	Female	-.015	57	.914	0.0002 (0.02%)
	Male	-.154	35	.378	0.0237 (2.37%)
Mid-ventral curved length	Total	.098	55	.476	0.0096 (0.96%)
	Female	.045	28	.819	0.0020 (0.20%)
	Male	.094	27	.642	0.0088 (0.88%)
Distance of medial borders of processus articulares superiores	Total	-.048	95	.642	0.0023 (0.23%)
	Female	-.039	54	.778	0.0015 (0.15%)
	Male	-.117	41	.465	0.0137 (1.37%)

Key:

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

7.5.1(ii) Test of association between age and sacral measurements by sample/group (Spearman's Rank Order Correlation) (contd.)

Variable	Sample	Spearman's Rank Order correlation coefficient			Coefficient of determination
		r _s	n	p value	
Distance of lateral borders of processus articulares superiores	Total	.216*	91	.040	0.0467 (4.67%)
	Female	.325*	53	.018	0.1056 (10.56%)
	Male	.079	38	.636	0.0062 (0.62%)
Spinal canal maximum transverse width	Total	.133	98	.192	0.0177 (1.77%)
	Female	.206	57	.125	0.0424 (4.24%)
	Male	-.008	41	.962	0.0001 (0.01%)
Combined transverse width of alae	Total	.038	71	.755	0.0014 (0.14%)
	Female	.241	42	.124	0.0581 (5.81%)
	Male	-.133	29	.491	0.0177 (1.77%)
Anterior mid ventral straight height of sacrum	Total	-.042	58	.752	0.0018 (0.18%)
	Female	-.049	30	.797	0.0024 (0.24%)
	Male	-.039	28	.843	0.0015 (0.15%)
Maximum depth of curvature of sacrum	Total	.366*	48	.011	0.1340 (13.40%)
	Female	.267	27	.178	0.0713 (7.13%)
	Male	.155	21	.503	0.0240 (2.40%)
Position of maximum depth of curvature of sacrum	Total	.180	75	.121	0.0324 (3.24%)
	Female	-.296	27	.133	0.0876 (8.76%)
	Male	-.196	21	.395	0.0384 (3.84%)

Key:

* Correlation is significant at the 0.05 level (2-tailed)

7.5.1(iii)

Test of association between age and innominate measurements by sample/group (Spearman's Rank Order Correlation)

Variable	Sample	Spearman's Rank Order correlation coefficient			Coefficient of determination
		r _s	n	p value	
LEFT Maximum innominate length (cm)	Total	.172	90	.105	0.0296 (2.96%)
	Female	.248	55	.068	0.0615 (6.15%)
	Male	.243	35	.160	0.0590 (5.90%)
RIGHT Maximum innominate length (cm)	Total	.189	93	.069	0.0357 (3.57%)
	Female	.267**	57	.045	0.0713 (7.13%)
	Male	.217	36	.203	0.0471 (4.71%)
LEFT Innominate breadth	Total	-.062	85	.572	0.0038 (0.38%)
	Female	.229	46	.126	0.0524 (5.24%)
	Male	.257	35	.136	0.0660 (6.60%)
RIGHT Innominate breadth	Total	.247*	81	.027	0.0610 (6.10%)
	Female	.378**	47	.009	0.1429 (14.29%)
	Male	.262	34	.134	0.0686 (6.86%)
LEFT Iliac height	Total	.343**	81	.002	0.1176 (11.76%)
	Female	.363**	58	.005	0.1318 (13.18%)
	Male	.206	38	.215	0.0424 (4.24%)
RIGHT Iliac height	Total	-.001	74	.996	<0.0001 (<0.01%)
	Female	.389**	58	.003	0.1513 (15.13%)
	Male	.222	38	.180	0.0493 (4.93%)
LEFT acetabulum diameter	Total	.255*	96	.012	0.0650 (6.50%)
	Female	.428**	54	.001	0.1832 (18.32%)
	Male	.200	37	.235	0.0400 (4.00%)
RIGHT acetabulum diameter	Total	.261*	96	.010	0.0681 (6.81%)
	Female	.396**	58	.002	0.1568 (15.68%)
	Male	.388	37	.018	0.1505 (15.05%)

Key:

* Correlation is significant at the 0.05 level (2-tailed) ** Correlation is significant at the 0.01 level (2-tailed)

7.5.1(iii)

Test of association between age and innominate measurements by sample/group (Spearman's Rank Order Correlation) (contd.)

Variable	Sample	Spearman's Rank Order correlation coefficient			Coefficient of determination
		r _s	n	p value	
LEFT Pubis length	Total	.346**	0	.006	0.1197 (11.97%)
	Female	.344*	33	.050	0.1183 (11.83%)
	Male	.342	28	.075	0.1170 (11.70%)
RIGHT Pubis length	Total	.261*	66	.034	0.0681 (6.81%)
	Female	.363*	38	.025	0.1318 (13.18%)
	Male	.151	28	.442	0.0228 (2.28%)
LEFT Minimum height of inf pubic ramus	Total	.013	56	.925	0.0002 (0.02%)
	Female	.187	49	.197	0.0350 (3.50%)
	Male	.059	36	.732	0.0035 (0.35%)
RIGHT Minimum height of inferior pubic ramus	Total	.119	85	.277	0.0142 (1.42%)
	Female	.316*	55	.019	0.0999 (9.99%)
	Male	.184	36	.283	0.0339 (3.39%)
LEFT Oblique length of inf pubic ramus	Total	.195	91	.064	0.0380 (3.80%)
	Female	.038	42	.812	0.0014 (0.14%)
	Male	-.144	34	.418	0.0207 (2.07%)
RIGHT Oblique length of inf pubic ramus	Total	.091	80	.424	0.0083 (0.83%)
	Female	.026	46	.865	0.0007 (0.07%)
	Male	-.098	34	.582	0.0096 (0.96%)
LEFT Tubercolusymphyseal height	Total	-.032	76	.781	0.0010 (0.10%)
	Female	.211	22	.346	0.0445 (4.45%)
	Male	-.171	24	.424	0.0292 (2.92%)
RIGHT Tubercolusymphyseal height	Total	-.040	80	.728	0.0016 (0.16%)
	Female	.147	21	.525	0.0216 (2.16%)
	Male	-.210	22	.348	0.0441 (4.41%)

Key:

* Correlation is significant at the 0.05 level (2-tailed) ** Correlation is significant at the 0.01 level (2-tailed)

7.5.1(iii)

Test of association between age and innominate measurements by sample/group (Spearman's Rank Order Correlation) (contd.)

Variable	Sample	Spearman's Rank Order correlation coefficient			Coefficient of determination
		r _s	n	p value	
LEFT Pubic acetabular length	Total	.351**	63	.005	0.1232 (12.32%)
	Female	.423*	34	.013	0.1789 (17.89%)
	Male	.228	29	.235	0.0520 (5.20%)
RIGHT Pubic acetabular length	Total	.244*	67	.047	0.0595 (5.95%)
	Female	.334*	38	.041	0.1116 (11.16%)
	Male	.057	29	.769	0.0032 (0.32%)
LEFT Pubic tubercle-acetabular length	Total	.181	45	.233	0.0328 (3.28%)
	Female	.173	21	.454	0.0299 (2.99%)
	Male	.146	24	.496	0.0213 (2.13%)
RIGHT Pubic tubercle-acetabular length	Total	.065	44	.674	0.0042 (0.42%)
	Female	-.079	22	.728	0.0062 (0.62%)
	Male	.162	22	.471	0.0262 (2.62%)
LEFT Ischial acetabular height	Total	.146	90	.170	0.0213 (2.13%)
	Female	.289*	55	.033	0.0835 (8.35%)
	Male	.202	35	.245	0.0408 (4.08%)
RIGHT Ischial acetabular height	Total	.146	93	.162	0.0213 (2.13%)
	Female	.267*	56	.046	0.0713 (7.13%)
	Male	.262	37	.117	0.0686 (6.86%)
LEFT Pubo-sacroiliac diameter	Total	.180	60	.168	0.0324 (3.24%)
	Female	.272	33	.125	0.0740 (7.40%)
	Male	-.015	27	.941	0.0002 (0.02%)
RIGHT Pubo-sacroiliac diameter	Total	.179	64	.156	0.0320 (3.20%)
	Female	.163	37	.335	0.0266 (2.66%)
	Male	.203	27	.311	0.0412 (4.12%)

Key:

*

Correlation is significant at the 0.05 level (2-tailed)

**

Correlation is significant at the 0.01 level (2-tailed)

7.5.1(iii)

7.5.1(iii)

Test of association between age and innominate measurements by sample/group (Spearman's Rank Order Correlation) (contd.)

Variable	Sample	Spearman's Rank Order correlation coefficient			Coefficient of determination
		r_s	n	p value	
LEFT Ischial spine to symphysis	Total	.362*	30	.049	0.1310 (13.10%)
	Female	.385	16	.141	0.1482 (14.82%)
	Male	.370	14	.193	0.1369 (13.69%)
RIGHT Ischial spine to symphysis	Total	.332	22	.131	0.1102 (11.02%)
	Female	.155	11	.650	0.0240 (2.40%)
	Male	.683*	11	.020	0.4665 (46.65%)
LEFT Symphyseal angle	Total	.078	71	.519	0.0061 (0.61%)
	Female	-.030	40	.855	0.0009 (0.09%)
	Male	.166	31	.371	0.0276 (2.76%)
RIGHT Symphyseal angle	Total	.233*	74	.046	0.0543 (5.43%)
	Female	.224	44	.144	0.0502 (5.02%)
	Male	.091	30	.631	0.0083 (0.83%)
LEFT Acetabulosciatic breadth	Total	.455**	97	<.001	0.2070 (20.70%)
	Female	.638**	60	<.001	0.4070 (40.70%)
	Male	.419**	37	.010	0.1756 (17.56%)
RIGHT Acetabulosciatic breadth	Total	.478**	97	<.001	0.2285 (22.85%)
	Female	.657**	59	<.001	0.4316 (43.16%)
	Male	.398*	38	.013	0.1584 (15.84%)

Key:

* Correlation is significant at the 0.05 level (2-tailed) ** Correlation is significant at the 0.01 level (2-tailed)

7.5.1(iii)

Test of association between age and innominate measurements by sample/group (Spearman’s Rank Order Correlation) (contd.)

Variable	Sample	Spearman’s Rank Order correlation coefficient			Coefficient of determination
		r _s	n	p value	
LEFT Ischium length	Total	.023	87	.835	0.0005 (0.05%)
	Female	.089	54	.522	0.0079 (0.79%)
	Male	.100	33	.581	0.0100 (1.00%)
RIGHT Ischium length	Total	.064	93	.539	0.0041 (0.41%)
	Female	.104	55	.449	0.0108 (1.08%)
	Male	.077	38	.647	0.0059 (0.59%)
LEFT Maximum length of obturator foramen	Total	.243*	88	.023	0.0590 (5.90%)
	Female	.343*	53	.012	0.1176 (11.76%)
	Male	.040	35	.819	0.0016 (0.16%)
RIGHT Maximum length of obturator foramen	Total	.158	90	.136	0.0250 (2.50%)
	Female	.227	57	.090	0.0515 (5.15%)
	Male	-.023	33	.901	0.0005 (0.05%)
LEFT Maximum width of obturator foramen	Total	.086	87	.430	0.0074 (0.74%)
	Female	.185	52	.190	0.0342 (3.42%)
	Male	-.168	35	.334	0.0282 (2.82%)
RIGHT Maximum width of obturator foramen	Total	.049	90	.649	0.0024 (0.24%)
	Female	.097	56	.477	0.0094 (0.94%)
	Male	-.073	34	.681	0.0053 (0.53%)
LEFT Auricular surface profile - a	Total	.237*	69	.050	0.0562 (5.62%)
	Female	.283	39	.081	0.0801 (8.01%)
	Male	.129	30	.496	0.0166 (1.66%)
RIGHT Auricular surface profile - a	Total	.288*	71	.015	0.0829 (8.29%)
	Female	.228	40	.158	0.0520 (5.20%)
	Male	.324	31	.075	0.1050 (10.50%)

Key:

* Correlation is significant at the 0.05 level (2-tailed)

7.5.1(iii)

Test of association between age and innominate measurements by sample/group (Spearman's Rank Order Correlation) (contd.)

Variable	Sample	Spearman's Rank Order correlation coefficient			Coefficient of determination
		r _s	n	p value	
LEFT Auricular surface profile - b	Total	.296*	70	.013	0.0876 (8.76%)
	Female	.465**	39	.003	0.2162 (21.62%)
	Male	.077	31	.682	0.0059 (0.59%)
RIGHT Auricular surface profile - b	Total	.302*	72	.010	0.0912 (9.12%)
	Female	.346*	41	.027	0.1197 (11.97%)
	Male	.181	31	.329	0.0328 (3.28%)
LEFT Auricular surface profile - c	Total	.095	91	.368	0.0090 (0.90%)
	Female	.076	55	.581	0.0058 (0.58%)
	Male	.199	36	.244	0.0396 (3.96%)
RIGHT Auricular surface profile - c	Total	.221*	88	.039	0.0488 (4.88%)
	Female	.275*	54	.044	0.0756 (7.56%)
	Male	.167	34	.345	0.0279 (2.79%)
LEFT Auricular surface profile - d	Total	.192	69	.115	0.0369 (3.69%)
	Female	.346*	39	.031	0.1197 (11.97%)
	Male	-.011	30	.953	0.0001 (0.01%)
RIGHT Auricular surface profile - d	Total	.373**	67	.002	0.1391 (13.91%)
	Female	.500**	37	.002	0.2500 (25.00%)
	Male	.177	30	.350	0.0313 (3.13%)
LEFT Auricular surface profile - e	Total	.016	69	.893	0.0003 (0.03%)
	Female	-.030	39	.855	0.0009 (0.09%)
	Male	.105	30	.580	0.0110 (1.10%)
RIGHT Auricular surface profile - e	Total	.084	69	.495	0.0071 (0.71%)
	Female	.013	39	.937	0.0002 (0.02%)
	Male	.108	30	.571	0.0117 (1.17%)

Key:

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

7.5.1(iii)

Test of association between age and innominate measurements by sample/group (Spearman's Rank Order Correlation) (contd.)

Variable	Sample	Spearman's Rank Order correlation coefficient			Coefficient of determination
		r _s	n	p value	
LEFT Auricular surface profile - f	Total	.064	69	.599	0.0041 (0.41%)
	Female	-.009	39	.956	0.0001 (0.01%)
	Male	.116	30	.541	0.0135 (1.35%)
RIGHT Auricular surface profile - f	Total	.128	66	.307	0.0164 (1.64%)
	Female	.086	37	.612	0.0074 (0.74%)
	Male	.264	29	.167	0.0697 (6.97%)
LEFT Sciatic notch width	Total	.350	26	.079	0.1225 (12.25%)
	Female	.718**	13	.006	0.5155 (51.55%)
	Male	-.124	13	.687	0.0154 (1.54%)
RIGHT Sciatic notch width	Total	-.014	24	.947	0.0002 (0.02%)
	Female	.067	9	.865	0.0045 (0.45%)
	Male	.201	15	.474	0.0404 (4.04%)
LEFT Sciatic notch height	Total	.125	23	.571	0.0156 (1.56%)
	Female	.280	10	.434	0.0784 (7.84%)
	Male	-.113	13	.713	0.0128 (1.28%)
RIGHT Sciatic notch height	Total	.142	23	.518	0.0202 (2.02%)
	Female	.250	9	.516	0.0625 (6.25%)
	Male	-.040	14	.893	0.0016 (0.16%)
LEFT Sciatic notch position	Total	.225	22	.315	0.0506 (5.06%)
	Female	.483	9	.187	0.2333 (23.33%)
	Male	.129	13	.673	0.0166 (1.66%)
RIGHT Sciatic notch position	Total	.164	23	.454	0.0269 (2.69%)
	Female	.200	9	.606	0.0400 (4.00%)
	Male	.097	14	.742	0.0094 (0.94%)

Key:

** Correlation is significant at the 0.01 level (2-tailed))

7.5.1(iv)

Test of association between age and reconstructed pelvis measurements by sample/group (Spearman's Rank Order Correlation)

Variable	Sample	Spearman's Rank Order correlation coefficient			Coefficient of determination
		r _s	n	p value	
A-P superior diameter of pelvis	Total	-.047	63	.712	0.0022 (0.22%)
	Female	-.122	33	.498	0.0149 (1.49%)
	Male	-.096	30	.614	0.0092 (0.92%)
A-P inferior diameter of pelvis	Total	-.004	40	.980	<0.0001 (<0.01%)
	Female	-.025	21	.915	0.0006 (0.06%)
	Male	-.086	19	.725	0.0074 (0.74%)
Transverse diameter of pelvis	Total	.179	70	.139	0.0320 (3.20%)
	Female	.144	40	.374	0.0207 (2.07%)
	Male	.053	30	.780	0.0028 (0.28%)
Greatest pelvic diameter	Total	.181	65	.148	0.0328 (3.28%)
	Female	.266	36	.116	0.0708 (7.08%)
	Male	.022	29	.911	0.0005 (0.05%)
Bispinous breadth	Total	-.112	18	.659	0.0125 (1.25%)
	Female	.018	7	.969	0.0003 (0.03%)
	Male	-.224	11	.508	0.0502 (5.02%)
Bi-tuberous diameter	Total	-.038	64	.766	0.0014 (0.14%)
	Female	.120	37	.478	0.0144 (1.44%)
	Male	-.497**	27	.008	0.2470 (24.70%)
Bi-tuberous width (cm)	Total	.140	64	.269	0.0196 (1.96%)
	Female	.412*	37	.011	0.1697 (16.97%)
	Male	-.192	27	.336	0.0369 (3.69%)
RIGHT ischial spine to sacral apex	Total	-.029	15	.919	0.0008 (0.08%)
	Female	.551	6	.257	0.3036 (30.36%)
	Male	-.285	9	.458	0.0812 (8.12%)

Key:

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

7.5.1(iv) Test of association between age and reconstructed pelvis measurements by sample/group (Spearman's Rank Order Correlation) (contd.)

Variable	Sample	Spearman's Rank Order correlation coefficient			Coefficient of determination
		r _s	n	p value	
LEFT ischial spine to sacral apex	Total	.089	24	.680	0.0079 (0.79%)
	Female	.382	12	.221	0.1459 (14.59%)
	Male	-.242	12	.448	0.0586 (5.86%)
RIGHT ischial tuberosity to sacral apex	Total	.011	40	.948	0.0001 (0.01%)
	Female	.040	21	.862	0.0016 (0.16%)
	Male	-.037	19	.880	0.0014 (0.14%)
LEFT ischial tuberosity to sacral apex	Total	.079	38	.638	0.0062 (0.62%)
	Female	.193	20	.414	0.0372 (3.72%)
	Male	-.147	18	.559	0.0216 (2.16%)
Subpubic angle	Total	-.154	65	.220	0.0237 (2.37%)
	Female	.078	36	.652	0.0061 (0.61%)
	Male	-.628**	29	.000	0.3944 (39.44%)
Inlet circumference (cm)	Total	.185	59	.161	0.0342 (3.42%)
	Female	.192	33	.284	0.0369 (3.69%)
	Male	.046	26	.822	0.0021 (0.21%)
Superior-anterior bi-iliac breadth of pelvis (cm)	Total	.145	61	.266	0.0210 (2.10%)
	Female	.072	33	.691	0.0052 (0.52%)
	Male	.261	28	.180	0.0681 (6.81%)
Inferior-posterior bi-iliac breadth of pelvis	Total	-.168	53	.230	0.0282 (2.82%)
	Female	.115	27	.568	0.0132 (1.32%)
	Male	-.468*	26	.016	0.2190 (21.90%)
Bi-acetabular breadth	Total	.096	69	.432	0.0092 (0.92%)
	Female	.135	38	.419	0.0182 (1.82%)
	Male	-.203	31	.274	0.0412 (4.12%)

Key:

* Correlation is significant at the 0.05 level (2-tailed) ** Correlation is significant at the 0.01 level (2-tailed)

7.5.1(v) Test of association between age and femoral measurements by sample (Pearson’s product moment correlation coefficient)

Measurement	Sample	Pearson’s product moment correlation			Coefficient of determination
		r	n	p value	
Left femur	Total	.162	76	.162	0.0262 (2.62%)
	Female	.264	49	.067	0.0697 (6.97%)
	Male	.274	27	.167	0.0751 (7.51%)
Right femur	Total	.097	96	.347	0.0094 (0.94%)
	Female	.129	58	.333	0.0166 (1.66%)
	Male	.134	38	.421	0.0180 (1.80%)

Appendix 8

Tests of correlation between individual measurements

7.5.2(ii)

Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group
(Pearson's product moment correlation coefficient)

Variable 1	Variable 2	Sample/group	Pearson's product moment correlation coefficient			Coefficient of determination
			r	n	p value	
Maximum superior sacral width	Left pubic acetabular length	Total	.776**	62	<.001	0.6022 (60.22%)
		Female	.735**	33	<.001	0.5402 (54.02%)
		Male	.793**	29	<.001	0.6288 (62.88%)
	Right pubic acetabular length	Total	.783**	65	<.001	0.6131 (61.31%)
		Female	.721**	37	<.001	0.5198 (51.98%)
		Male	.851**	28	<.001	0.7242 (72.42%)
Maximum inferior sacral width	Transverse diameter Of pelvis	Total	.699**	68	<.001	0.4886 (48.86%)
		Female	.720**	40	<.001	0.5184 (51.84%)
		Male	.644**	27	<.001	0.4147 (41.47%)
	Right ischial spine To sacral apex	Total	.829**	15	<.001	0.6872 (68.72%)
		Female	.967**	6	.002	0.9351 (93.51%)
		Male	.650	9	.058	0.422 (42.25%)
Mid ventral curved length of sacrum	Left ischial spine To sacral apex†	Total	.622**	23	.002	0.3869 (38.69%)
		Female	.466	11	.149	0.2172 (21.72%)
		Male	.620*	12	.031	0.3844 (38.44%)
	Anterior mid ventral straight height of sacrum	Total	.848**	54	<.001	0.7191 (71.91%)
		Female	.913**	27	<.001	0.8336 (83.36%)
		Male	.768**	27	<.001	0.5898 (58.98%)
Distance of lateral borders of processus articulares superiores	Spinal canal maximum transverse width	Total	.750**	91	<.001	0.5625 (56.25%)
		Female	.776**	53	<.001	0.6022 (60.22%)
		Male	.714**	38	<.001	0.5098 (50.98%)
	Distance of medial borders of processus articulares superiores†	Total	.620**	93	<.001	0.3844 (38.44%)
		Female	.605**	52	<.001	0.3660 (36.60%)
		Male	.620**	41	<.001	0.3844 (38.44%)

Key:

- † Measurement included for comparative reasons only
 * Correlation is significant at the 0.05 level (2-tailed)
 ** Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii)

Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group
(Pearson's product moment correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Pearson's product moment correlation coefficient			Coefficient of determination
			r	n	p value	
Combined transverse width of alae	Bispinous breadth	Total	.717**	16	.002	0.5141 (51.41%)
		Female	.877*	6	.022	0.7691 (76.91%)
		Male	.158	10	.662	0.0250 (2.50%)
	Right ischial spine to sacral apex	Total	.853**	13	<.001	0.7276 (72.76%)
		Female	.812	5	.095	0.6593 (65.93%)
		Male	.594	8	.121	0.3528 (35.28%)
	Left ischial spine to sacral apex	Total	.820**	20	<.001	0.6724 (67.24%)
		Female	.555	9	.121	0.3080 (30.80%)
		Male	.613*	11	.045	0.3758 (37.58%)
Anterior mid ventral straight height of sacrum	Subpubic angle	Total	.704**	46	<.001	0.4956 (49.56%)
		Female	.551**	26	.004	0.3036 (30.36%)
		Male	.272	20	.247	0.0740 (7.40%)
	Position of maximum depth of curvature of sacrum	Total	.751**	47	<.001	0.5640 (56.40%)
		Female	.755**	26	<.001	0.5700 (57.00%)
		Male	.711**	21	<.001	0.5055 (50.55%)
	Bispinous breadth	Total	-.708**	13	.007	0.5013 (50.13%)
		Female	-.676	5	.211	0.4570 (45.70%)
		Male	-.547	8	.161	0.2992 (29.92%)

Key:

- * Correlation is significant at the 0.05 level (2-tailed)
- ** Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii) Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group (Pearson's product moment correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Pearson's product moment correlation coefficient			Coefficient of determination
			r	n	p value	
Left maximum innominate length	Right maximum innominate length	Total	.975**	85	<.001	0.9506 (95.06%)
		Female	.930**	53	<.001	0.8649 (86.49%)
		Male	.958**	32	<.001	0.9178 (91.78%)
	Left iliac height	Total	.904	87	<.001	0.8172 (81.72%)
		Female	.856**	53	<.001	0.7327 (73.27%)
		Male	.867**	34	<.001	0.7517 (75.17%)
	Right iliac height	Total	.887**	84	<.001	0.7868 (78.68%)
		Female	.816**	52	<.001	0.6659 (66.59%)
		Male	.838**	32	<.001	0.7022 (70.22%)
	Left acetabulum diameter	Total	.830**	86	<.001	0.6889 (68.89%)
		Female	.565**	53	<.001	0.3192 (31.92%)
		Male ¹	-	-	-	-
	Right acetabulum diameter	Total	.815**	85	<.001	0.6642 (66.42%)
		Female	.576**	53	<.001	0.3318 (33.18%)
		Male	.651**	32	<.001	0.4238 (42.38%)
	Left pubic tubercle -acetabular length	Total	.713**	44	<.001	0.5084 (50.84%)
		Female	.717**	21	<.001	0.5141 (51.41%)
		Male	.771**	23	<.001	0.5944 (59.44%)
	Right pubic tubercle -acetabular length [†]	Total	.693**	41	<.001	0.4802 (48.02%)
		Female	.652**	21	.001	0.4251 (42.51%)
		Male	.672**	20	.001	0.4516 (45.16%)

Key:

¹ Employment of Spearman's test. Results were $r_s = .792^{**}$, $n = 33$, and $p = <.001$
[†] Measurement included for comparative reasons only
^{**} Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii) Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group (Pearson's product moment correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Pearson's product moment correlation coefficient			Coefficient of determination
			r	n	p value	
Left maximum innominate length	Left ischial acetabular height ²	Total	.912**	87	<.001	0.8317 (83.17%)
		Female	.781**	53	<.001	0.6100 (61.00%)
		Male	.859**	34	<.001	0.7379 (73.79%)
	Left acetabulosciatic breadth ³	Total	.722**	86	<.001	0.5213 (52.13%)
		Female	.420**	55	.001	0.1764 (17.64%)
		Male	.659**	31	<.001	0.4343 (43.43%)
	Left ischium length	Total	.866**	84	<.001	0.7500 (75.00%)
		Female	.714**	52	<.001	0.5098 (50.98%)
		Male	.764**	32	<.001	0.5837 (58.37%)
	Right ischium length	Total	.844**	86	<.001	0.7123 (71.23%)
		Female	.679**	53	<.001	0.4610 (46.10%)
		Male	.751**	33	<.001	0.5640 (56.40%)
	Right maximum length of obturator foramen	Total	.740**	82	<.001	0.5476 (54.76%)
		Female	.328*	51	.019	0.1076 (10.76%)
		Male	.745**	32	<.001	0.5550 (55.50%)
	Left maximum length of obturator foramen [†]	Total	.698**	83	<.001	0.4872 (48.72%)
		Female	.592**	53	<.001	0.3505 (35.05%)
		Male	.629**	29	<.001	0.3956 (39.56%)

Key:

² Corresponding comparative right measurement employed Spearman's test. Results were $r_s = .919^{**}$, $n = 85$, and $p = <.001$
³ Corresponding comparative right measurement employed Spearman's test. Results were $r_s = .689^{**}$, $n = 87$, and $p = <.001$
[†] Measurement included for comparative reasons only
* Correlation is significant at the 0.05 level (2-tailed)
** Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii)

Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group
(Pearson's product moment correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Pearson's product moment correlation coefficient			Coefficient of determination
			r	n	p value	
Right maximum innominate length	Left innominate breadth	Total	.712**	75	<.001	0.5069 (50.69%)
		Female	.737**	43	<.001	0.5432 (54.32%)
		Male	.744**	32	<.001	0.5535 55.35%)
	Right innominate breadth	Total	.716**	76	<.001	0.5127 (51.27%)
		Female	.712**	44	<.001	0.5069 (50.69%)
		Male	.741**	32	<.001	0.5491 (54.91%)
	Left iliac height	Total	.901**	87	<.001	0.8118 (81.18%)
		Female	.813**	54	<.001	0.6610 (66.10%)
		Male	.861**	33	<.001	0.7413 (74.13%)
	Right iliac height	Total	.900**	90	<.001	0.8100 (81.00%)
		Female	.816**	55	<.001	0.6659 (66.59%)
		Male	.833**	35	<.001	0.6939 (69.39%)
	Left acetabulum diameter	Total	.806**	85	<.001	0.6496 (64.96%)
		Female	.479**	52	<.001	0.2294 (22.94%)
		Male ⁴	-	-	-	-
	Right acetabulum diameter	Total	.822**	90	<.001	0.6757 (67.57%)
		Female	.569**	55	<.001	0.3238 (32.38%)
		Male	.686**	35	<.001	0.4706 (47.06%)
	Left minimum height of Inferior pubic ramus	Total	.718**	79	<.001	0.5155 (51.55%)
		Female	.348*	47	.017	0.1211 (12.11%)
		Male	.437*	32	.012	0.1910 (19.10%)
	Right minimum height of Inferior pubic ramus [†]	Total	.690**	86	<.001	0.4761 (47.61%)
		Female	.342*	32	.013	0.1170 (11.70%)
		Male	.451**	34	.007	0.2034 (20.34%)

Key:

⁴ Employment of Spearman's test. Results were $r_s = .777^{**}$, $n = 33$, and $p = <.001$
[†] Measurement included for comparative reasons only
* Correlation is significant at the 0.05 level (2-tailed)
** Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii) Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group (Pearson’s product moment correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Pearson’s product moment correlation coefficient			Coefficient of determination
			r	n	p value	
Right maximum innominate length	Left pubic tubercle -acetabular length	Total	.715**	43	<.001	0.5112 (51.12%)
		Female	.692**	21	.001	0.4789 (47.89%)
		Male	.804**	22	<.001	0.6464 (64.64%)
	Right pubic tubercle -acetabular length [†]	Total	.699**	41	<.001	0.4886 (48.86%)
		Female	.634**	21	.002	0.4020 (40.20%)
		Male	.664**	20	.001	0.4409 (44.09%)
	Left ischial acetabular height [‡]	Total	.899**	84	<.001	0.8082 (80.82%)
		Female	.751**	52	<.001	0.5640 (56.40%)
		Male	.828**	32	<.001	0.6856 (68.56%)
	Left ischium length	Total	.867**	81	<.001	0.7517 (75.17%)
		Female	.754**	51	<.001	0.5685 (56.85%)
		Male	.694**	30	<.001	0.4816 (48.16%)
	Right ischium length	Total	.861**	88	<.001	0.7413 (74.13%)
		Female	.720**	53	<.001	0.5184 (51.84%)
		Male	.714**	35	<.001	0.5098 (50.98%)
	Left maximum length of obturator foramen	Total	.709**	82	<.001	0.5027 (50.27%)
		Female	.369**	51	.008	0.1362 (13.62%)
		Male	.667**	31	<.001	0.4449 (44.49%)
	Right maximum length of obturator foramen	Total	.761**	86	<.001	0.5791 (57.91%)
		Female	.593**	54	<.001	0.3516 (35.16%)
		Male	.650**	32	<.001	0.4225 (42.25%)

Key:

† Measurement included for comparative reasons only
 ‡ Corresponding comparative right measurement employed Spearman’s test. Results were r_s = .913**, n = 88, and p = <.001
 ** Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii)

Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group (Pearson's product moment correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Pearson's product moment correlation coefficient			Coefficient of determination
			r	n	p value	
Right maximum innominate length	Left sciatic notch position	Total	.733**	22	<.001	0.5373 (53.73%)
		Female	.437	9	.240	0.1910 (19.10%)
		Male	.732**	13	.004	0.5358 (53.58%)
	Right sciatic notch position [†]	Total	.485*	23	.019	0.2352 (23.52%)
		Female	.511	9	.160	0.2611 (26.11%)
		Male	.274	14	.343	0.0751 (7.51%)
Left innominate breadth	Right innominate breadth	Total	.958**	74	<.001	0.9178 (91.78%)
		Female	.928**	40	<.001	0.8612 (86.12%)
		Male	.975**	34	<.001	0.9506 (95.06%)
Left iliac height	Right iliac height	Total	.953**	90	<.001	0.9082 (90.82%)
		Female	.918**	55	<.001	0.8427 (84.27%)
		Male	.939**	35	<.001	0.8817 (88.17%)
	Left acetabulum diameter	Total	.741**	90	<.001	0.5491(54.91%)
		Female	.472**	52	<.001	0.2228 (22.28%)
		Male ⁶	-	-	-	-
	Right acetabulum diameter	Total	.750**	89	<.001	0.5625 (56.25%)
		Female	.531**	55	<.001	0.2820 (28.20%)
		Male	.578**	34	<.001	0.3341 (33.41%)
	Right pubic tubercle -acetabular length	Total	.709**	42	<.001	0.5027 (50.27%)
		Female	.597**	20	.005	0.3564 (35.64%)
		Male	.561**	22	.001	0.3147 (31.47%)
	Left pubic tubercle -acetabular length [†]	Total	.689**	43	<.001	0.4747 (47.47%)
		Female	.683**	19	.001	0.4665 (46.65%)
		Male	.659**	24	<.001	0.4343 (43.43%)

Key:

- † Measurement included for comparative reasons only
- 6 Employment of Spearman's test. Results were $r_s = .721^{**}$, $n = 35$, and $p = <.001$
- * Correlation is significant at the 0.05 level (2-tailed)
- ** Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii) Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group (Pearson's product moment correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Pearson's product moment correlation coefficient			Coefficient of determination
			r	n	p value	
Left iliac height	Left ischial acetabular height ⁷	Total	.791**	90	<.001	0.6257 (62.57%)
		Female	.620**	55	<.001	0.3844 (38.44%)
		Male	.713**	35	<.001	0.5084 (50.84%)
	Right maximum length of obturator foramen	Total	.708**	85	<.001	0.5013 (50.13%)
		Female	.537**	55	<.001	0.2884 (28.84%)
		Male	.602**	30	<.001	0.3624 (36.24%)
	Left maximum length of obturator foramen [†]	Total	.652**	84	<.001	0.4251 (42.51%)
		Female	.343*	51	.014	0.1176 (11.76%)
		Male	.690**	33	<.001	0.4761 (47.61%)
Right iliac height	Left acetabulum diameter	Total	.727**	86	<.001	0.5285 (52.85%)
		Female	.427**	51	.002	0.1823 (18.23%)
		Male ⁸	-	-	-	-
	Right acetabulum diameter	Total	.740**	89	<.001	0.5476 (54.76%)
		Female	.492**	54	<.001	0.2421 (24.21%)
		Male	.606**	35	<.001	0.3672 (36.72%)
	Left ischial acetabular height ⁹	Total	.785**	84	<.001	0.6162 (61.62%)
		Female	.590**	52	<.001	0.3481 (34.81%)
		Male	.714**	32	<.001	0.5098 (50.98%)
	Right maximum length of obturator foramen	Total	.711**	84	<.001	0.5055 (50.55%)
		Female	.530**	53	<.001	0.2809 (28.09%)
		Male	.591**	31	<.001	0.3493 (34.93%)

Key:

⁷ Corresponding comparative right measurement employed Spearman's test. Results were $r_s = .809^{**}$, $n = 89$, and $p = <.001$

⁸ Employment of Spearman's test. Results were $r_s = .693^{**}$, $n = 35$, and $p = <.001$

⁹ Corresponding comparative right measurement employed Spearman's test. Results were $r_s = .792^{**}$, $n = 89$, and $p = <.001$

[†] Measurement included for comparative reasons only

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii)

Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group (Pearson's product moment correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Pearson's product moment correlation coefficient			Coefficient of determination
			r	n	p value	
Right iliac height	Left maximum length of obturator foramen [†]	Total	.667**	82	.019	0.4449 (44.49%)
		Female	.374**	50	.007	0.1399 (13.99%)
		Male	.656**	32	<.001	0.4303 (43.03%)
Left acetabulum diameter	Right acetabulum diameter	Total	.936**	87	<.001	0.8761 (87.61%)
		Female	.878**	53	<.001	0.7709 (77.09%)
		Male	.866**	34	<.001	0.7500 (75.00%)
	Left minimum height of inferior pubic ramus	Total	.700**	77	<.001	0.4900 (49.00%)
		Female	.267	44	.079	0.0713 (7.13%)
		Male	.407*	33	.019	0.1656 (16.56%)
	Right minimum height of inferior pubic ramus [†]	Total	.663**	83	<.001	0.4396 (43.96%)
		Female	.281*	50	.048	0.0790 (7.90%)
		Male	.341	33	.052	0.1163 (11.63%)
	Left ischial acetabular height ¹⁰	Total	.864**	85	<.001	0.7465 (74.65%)
		Female	.635**	52	<.001	0.4032 (40.32%)
		Male	.771**	33	<.001	0.5944 (59.44%)p
	Left acetabulosciatic breadth ¹¹	Total	.718**	88	<.001	0.5155 (51.55%)
		Female	.485**	54	<.001	0.2352 (23.52%)
		Male	.579**	34	<.001	0.3352 (33.52%)
	Left ischium length	Total	.729**	82	<.001	0.5314 (53.14%)
		Female	.415**	51	.002	0.1722 (17.22%)
		Male	.478**	31	.007	0.2285 (22.85%)
	Right ischium length	Total	.726**	86	<.001	0.5271 (52.71%)
		Female	.468**	51	.001	0.2190 (21.90%)
		Male	.479**	35	.004	0.2294 (22.94%)

Key:

[†] Measurement included for comparative reasons only

¹⁰ Corresponding comparative right measurement employed Spearman's test. Results were $r_s = .888^{**}$, $n = 86$, and $p = <.001$

¹¹ Corresponding comparative right measurement employed Spearman's test. Results were $r_s = .716^{**}$, $n = 87$, and $p = <.001$

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii) Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group
(Pearson's product moment correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Pearson's product moment correlation coefficient			Coefficient of determination
			r	n	p value	
Left acetabulum diameter	Right maximum length of obturator foramen	Total	.746**	84	<.001	0.5565 (55.65%)
		Female	.557**	52	<.001	0.3102 (31.02%)
		Male	.560**	31	<.001	0.3136 (31.36%)
	Left maximum length of obturator foramen	Total	.715**	83	<.001	0.5112 (51.12%)
		Female	.519**	50	<.001	0.2694 (26.94%)
		Male	.618**	34	<.001	0.3819 (38.19%)
Right acetabulum diameter	Left ischial acetabular height ¹²	Total	.847**	85	<.001	0.7174 (71.74%)
		Female	.666**	53	<.001	0.4436 (44.36%)
		Male	.636**	32	<.001	0.4045 (40.45%)
	Left acetabulosciatic breadth ¹³	Total	.734**	92	<.001	0.5388 (53.88%)
		Female	.510**	58	<.001	0.2601 (26.01%)
		Male	.609**	34	<.001	0.3709 (37.09%)
	Left ischium length	Total	.738**	82	<.001	0.5446 (54.46%)
		Female	.432**	52	.001	0.1866 (18.66%)
		Male	.459*	30	.011	0.2107 (21.07%)
	Right ischium length	Total	.737**	88	<.001	0.5432 (54.32%)
		Female	.450**	53	.001	0.2025 (20.25%)
		Male	.465**	35	.005	0.2162 (21.62%)
	Right maximum length of obturator foramen	Total	.711**	83	<.001	0.5055 (50.55%)
		Female	.633**	55	<.001	0.4007 (40.07%)
		Male	.542**	33	.001	0.2938 (29.38%)
	Left maximum length of obturator foramen	Total	.758**	88	<.001	0.5746 (57.46%)
		Female	.456**	51	.001	0.2079 (20.79%)
		Male	.519**	32	.002	0.2694 (26.94%)

Key:

¹² Corresponding comparative right measurement employed Spearman's test. Results were $r_s = .897^{**}$, $n = 89$, and $p = <.001$
¹³ Corresponding comparative right measurement employed Spearman's test. Results were $r_s = .655^{**}$, $n = 92$, and $p = <.001$
* Correlation is significant at the 0.05 level (2-tailed)
** Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii)

Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group (Pearson’s product moment correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Pearson’s product moment correlation coefficient			Coefficient of determination
			r	n	p value	
Left pubis length	Right pubis length	Total	.879**	56	<.001	0.7726 (77.26%)
		Female	.852**	31	<.001	0.7259 (72.59%)
		Male	.919**	25	<.001	0.8446 (84.46%)
	Left pubic acetabular length	Total	.744**	60	<.001	0.5535 (55.35%)
		Female	.738**	32	<.001	0.5446 (54.46%)
		Male	.745**	28	<.001	0.5550 (55.50%)
	Right pubic acetabular length	Total	.753**	56	<.001	0.5670 (56.70%)
		Female	.795**	31	<.001	0.6320 (63.20%)
		Male	.708**	25	<.001	0.5013 (50.13%)
Right pubis length	Right pubic acetabular length	Total	.724**	65	<.001	0.5242 (52.42%)
		Female	.775**	37	<.001	0.6006 (60.06%)
		Male	.653**	28	<.001	0.4264 (42.64%)
	Left pubic acetabular length†	Total	.667**	56	<.001	0.4449 (44.49%)
		Female	.670**	31	<.001	0.4489 (44.89%)
		Male	.682**	25	<.001	0.4651 (46.51%)
	Left ischial spine to symphysision	Total	.767**	26	<.001	0.5883 (58.83%)
		Female	.859**	15	<.001	0.7379 (73.79%)
		Male	.606*	11	.048	0.3672 (36.72%)
	Right ischial spine to symphysision†	Total	.616**	22	<.001	0.3795 (37.95%)
		Female	.767**	11	.006	0.5883 (58.83%)
		Male	.294	11	.381	0.0864 (8.64%)

Key:

- † Measurement included for comparative reasons only
- * Correlation is significant at the 0.01 level (2-tailed)
- ** Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii)

Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group (Pearson's product moment correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Pearson's product moment correlation coefficient			Coefficient of determination
			r	n	p value	
Left minimum height of inferior pubic ramus	Right minimum height of inferior pubic ramus	Total	.851**	80	<.001	0.7242 (72.42%)
		Female	.655**	47	<.001	0.4290 (42.90%)
		Male	.807**	33	<.001	0.6512 (65.12%)
Right minimum height of inferior pubic ramus	Left ischial acetabular height ¹⁴	Total	.748**	76	<.001	0.5595 (55.95%)
		Female	.463**	45	.001	0.2144 (21.44%)
		Male	.427*	31	.017	0.1823 (18.23%)
Left oblique length of inferior pubic ramus	Right oblique length of inferior pubic ramus	Total	.703**	82	<.001	0.4942 (49.42%)
		Female	.347*	51	.013	0.1204 (12.04%)
		Male	.476**	31	.008	0.2266 (22.66%)
Left tubercolusymphyseal height	Right tubercolusymphyseal height	Total	.732**	72	<.001	0.5358 (53.58%)
		Female	.531**	41	<.001	0.2820 (28.20%)
		Male	.796**	31	<.001	0.6336 (63.36%)
	Right ischial spine to sacral apex	Total	.821**	39	<.001	0.6740 (67.40%)
		Female	.785**	18	<.001	0.6162 (61.62%)
		Male	.811**	21	<.001	0.6577 (65.77%)
	Left ischial spine to sacral apex	Total	.759**	12	<.001	0.5761 (57.61%)
		Female	.765	4	.235	0.5852 (58.52%)
		Male	.737*	8	.037	0.5432 (54.32%)
		Total	.732	19	<.001	0.5358 (53.58%)
		Female	.741*	10	.014	0.5491(54.91%)
		Male	.518	9	.154	0.2683 (26.83%)

Key:

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¹⁵
*
**
- Corresponding comparative right measurement employed Spearman's test. Results were $r_s = .782^{**}$, $n = 80$, and $p = <.001$
Corresponding comparative right measurement employed Spearman's test. Results were $r_s = .743^{**}$, $n = 87$, and $p = <.001$
Correlation is significant at the 0.05 level (2-tailed)
Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii) Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group (Pearson’s product moment correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Pearson’s product moment correlation coefficient			Coefficient of determination
			r	n	p value	
Right tuberculosymphyseal height	Right ischial spine to sacral apex	Total	.887**	11	<.001	0.7868 (78.68%)
		Female	.952**	4	.048	0.9063 (90.63%)
		Male	.472	7	.284	0.2228 (22.28%)
Left pubic acetabular length	Left ischial spine to sacral apex†	Total	.695**	17	<.001	0.4830 (48.30%)
		Female	.628	9	.070	0.3944 (39.44%)
		Male	.164	8	.698	0.0269 (2.69%)
	Right pubic acetabular length	Total	.911**	57	<.001	0.8299 (82.99%)
		Female	.898**	32	<.001	0.8064 (80.64%)
		Male	.920**	25	<.001	0.8464 (84.64%)
	Transverse diameter of pelvis	Total	.724**	56	<.001	0.5242 (52.42%)
		Female	.715**	30	<.001	0.5112 (51.12%)
		Male	.754**	26	<.001	0.5685 (56.85%)
	Inlet circumference	Total	.735**	54	<.001	0.5402 (54.02%)
		Female	.644**	29	<.001	0.4147 (41.47%)
		Male ¹⁶	-	-	-	-
	Biacetabular breadth	Total	.709**	54	<.001	0.5027 (50.27%)
		Female	.802**	28	<.001	0.6432 (64.32%)
		Male	.633**	26	.001	0.4007 (40.07%)

Key:

- † Measurement included for comparative reasons only
- ¹⁶ Employment of Spearman’s test. Results were $r_s = .548^{**}$, $n = 26$, and $p = .001$
- ** Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii) Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group (Pearson's product moment correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Pearson's product moment correlation coefficient			Coefficient of determination
			r	n	p value	
Right pubic acetabular length	Transverse diameter of pelvis	Total	.733**	56	<.001	0.5373 (53.73%)
	pelvis	Female	.771**	30	<.001	0.5944 (59.44%)
		Male	.740**	26	<.001	0.5476 (54.76%)
	Inlet circumference	Total	.720**	53	<.001	0.5184 (51.84%)
		Female	.629**	29	<.001	0.3956 (39.56%)
		Male ¹⁷	-	-	-	-
		Total	.699**	54	<.001	0.4886 (48.86%)
	Biacetablar breadth	Female	.804**	28	<.001	0.6464 (64.64%)
		Male	.639**	26	<.001	0.4083 (40.83%)
	Left pubic tubercle acetabular length	Right pubic tubercle acetabular length	Total	.836**	38	<.001
Female			.787**	17	<.001	0.6194 (61.94%)
Male			.836**	21	<.001	0.6989 (69.89%)
Left ischial acetabular height ¹⁸		Total	.701**	42	<.001	0.4914 (49.14%)
		Female	.725**	19	<.001	0.5256 (52.56%)
		Male	.696**	23	<.001	0.4844 (48.44%)
Right pubic tubercle acetabular length	Left ischial acetabular height ¹⁹	Total	.754**	40	<.001	0.5685 (56.85%)
		Female	.694**	24	.001	0.4816 (48.16%)
		Male	.659**	20	.002	0.4343 (43.43%)

Key:

¹⁷ Employment of Spearman's test. Results were $r_s = .712^{**}$, $n = 24$, and $p = <.001$
¹⁸ Corresponding comparative right measurement employed Spearman's test. Results were $r_s = .624^{**}$, $n = 43$, and $p = <.001$
¹⁹ Corresponding comparative right measurement employed Spearman's test. Results were $r_s = .675^{**}$, $n = 42$, and $p = <.001$
****** Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii)

Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group (Pearson's product moment correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Pearson's product moment correlation coefficient			Coefficient of determination
			r	n	p value	
Right pubic tubercle acetabular length	Left ischium length	Total	.700**	39	<.001	0.4900 (49.00%)
		Female	.549**	20	.012	0.3014 (30.14%)
		Male	.613**	19	.005	0.3758 (37.58%)
	Right ischium length†	Total	.645**	41	<.001	0.4160 (41.60%)
		Female	.396	20	.084	0.1568 (15.68%)
		Male	.608**	21	.003	0.3697 (36.97%)
	Right maximum length of obturator foramen	Total	.701**	43	<.001	0.4914 (49.14%)
		Female	.567**	22	.006	0.3215 (32.15%)
		Male	.662**	21	.001	0.4382 (43.82%)
Left ischial acetabular height ²⁰	Left maximum length of obturator foramen†	Total	.471**	40	<.001	0.2218 (22.18%)
		Female	-.048	20	.841	0.0023 (0.23%)
		Male	.724**	20	<.001	0.5242 (52.42%)
	Left ischium length	Total	.881**	87	<.001	0.7762 (77.62%)
		Female	.745**	54	<.001	0.5550 (55.50%)
		Male	.767**	33	<.001	0.5883 (58.83%)
	Right ischium length	Total	.838**	86	<.001	0.7022 (70.22%)
		Female	.661**	53	<.001	0.4369 (43.69%)
		Male	.739**	33	<.001	0.5461 (54.61%)

Key:

†

Measurement included for comparative reasons only

²⁰

Corresponding comparative right measurement employed Spearman's test. Results were $r_s = .970^{**}$, $n = 86$, and $p = <.001$

**

Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii)

Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group
(Spearman's Rank Order correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Spearman's Rank Order correlation coefficient			Coefficient of determination
			r_s	n	p value	
Right ischial acetabular height	Left ischium length	Total	.874**	84	<.001	0.7639 (76.39%)
		Female	.779**	53	<.001	0.6068 (60.68%)
		Male ²¹	-	-	-	-
	Right ischium length	Total	.877**	90	<.001	0.7691 (76.91%)
		Female	.765**	54	<.001	0.5852 (58.52%)
		Male ²²	-	-	-	-
	Right maximum length of obturator foramen	Total	.752**	81	<.001	0.5655 (56.55%)
		Female	.620**	55	<.001	0.3844 (38.44%)
		Male ²³	-	-	-	0.3318 (33.18%)
	Left maximum length of obturator foramen	Total	.780**	86	<.001	0.6084 (60.84%)
		Female	.406**	50	.003	0.1648 (16.48%)
		Male ²⁴	-	-	-	-

Key:

- ²¹
- Employment of Pearson's test. Results were $r = .704^{**}$, $n = 31$, and $p = <.001$
- ²²
- Employment of Pearson's test. Results were $r = .698^{**}$, $n = 36$, and $p = <.001$
- ²³
- Employment of Pearson's test. Results were $r = .579^{**}$, $n = 31$, and $p = .001$
- ²⁴
- Employment of Pearson's test. Results were $r = .619^{**}$, $n = 31$, and $p = <.001$
- **
- Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii) Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group
(Pearson's product moment correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Pearson's product moment correlation coefficient			Coefficient of determination
			r	n	p value	
Left pubosacroiliac diameter	Right pubosacroiliac diameter	Total	.864**	53	<.001	0.7465 (74.65%)
		Female	.871**	30	<.001	0.7586 (75.86%)
		Male	.845**	23	<.001	0.7140 (71.40%)
	Antero-posterior superior diameter of pelvis	Total	.702**	53	<.001	0.4928 (49.28%)
		Female	.699**	28	<.001	0.4886 (48.86%)
		Male	.613**	25	.001	0.3758 (37.58%)
	Greatest pelvic diameter	Total	.739**	52	<.001	0.5461 (54.61%)
		Female	.721**	28	<.001	0.5198 (51.98%)
		Male	.692**	24	<.001	0.4789 (47.89%)
Right pubosacroiliac diameter	Inlet circumference	Total	.719**	52	<.001	0.5170 (51.70%)
		Female	.701**	28	<.001	0.4914 (49.14%)
		Male ²⁵	-	-	<.001	-
	Right sciatic notch width	Total	.816**	14	<.001	0.6659 (66.59%)
		Female ²⁶	-	-	<.001	-
		Male	.719*	9	.029	0.5170 (51.70%)
	Left sciatic notch width [†]	Total	.390	20	.089	0.1521 (15.21%)
		Female	.178	11	.600	0.0317 (3.17%)
		Male	.245	9	.526	0.0600 (6.00%)
	Antero-posterior superior diameter of pelvis	Total	.709**	53	<.001	0.5027 (50.27%)
		Female	.817**	29	<.001	0.6675 (66.75%)
		Male	.532**	24	.008	0.2830 (28.30%)

Key:

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²⁶

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*

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Employment of Spearman's test. Results were $r_s = .606^{**}$, $n = 24$, and $p = .002$
Employment of Spearman's test. Results were $r_s = .600$, $n = 5$, and $p = .285$
Measurement included for comparative reasons only
Correlation is significant at the 0.05 level (2-tailed)
Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii) Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group
(Pearson's product moment correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Pearson's product moment correlation coefficient			Coefficient of determination
			r	n	p value	
Left pubic symphysis depth	Right pubic symphysis depth	Total	.896**	59	<.001	0.8028 (80.28%)
		Female	.873**	32	<.001	0.7621 (76.21%)
		Male	.819**	27	<.001	0.6708 (67.08%)
Right pubic symphysis depth	Left maximum width of pubic symphysis	Total	.705**	58	<.001	0.4970 (49.70%)
		Female	.601**	33	<.001	0.3612 (36.12%)
		Male	.405*	25	.045	0.1640 (16.40%)
	Right maximum width of pubic symphysis†	Total	.624**	66	<.001	0.3894 (38.94%)
		Female	.533**	38	.001	0.2841 (28.41%)
		Male	.260	28	.181	0.0676 (6.76%)
Left pubic symphysis superior width ²⁷	Left pubic symphysis inferior width	Total	.707**	66	<.001	0.4998 (49.98%)
		Female	.531**	35	.001	0.2820 (28.20%)
		Male	.516**	31	.003	0.2663 (26.63%)
	Right pubic symphysis inferior width†	Total	.677**	58	<.001	0.4583 (45.83%)
		Female	.647**	31	<.001	0.4186 (41.86%)
		Male	.291	27	.142	0.0847 (8.47%)
	Left maximum width of pubic symphysis	Total	.938**	64	<.001	0.8798 (87.98%)
		Female	.921**	35	<.001	0.8482 (84.82%)
		Male	.868**	29	<.001	0.7534 (75.34%)
	Right maximum width of pubic symphysis	Total	.880**	57	<.001	0.7744 (77.44%)
		Female	.859**	32	<.001	0.7379 (73.79%)
		Male	.725**	25	<.001	0.5256 (52.56%)

Key:

†

²⁷

*

**

Measurement included for comparative reasons only
Corresponding comparative right measurement employed Spearman's test. Results were $r_s = .881^{**}$, $n = 59$, and $p = <.001$
Correlation is significant at the 0.05 level (2-tailed)
Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii)

Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group (Spearman's Rank Order correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Spearman's Rank Order correlation coefficient			Coefficient of determination
			r_s	n	p value	
Right pubic symphysis superior width	Right pubic symphysis inferior width	Total	.705**	67	<.001	0.4970 (49.70%)
		Female	.588**	37	<.001	0.3457 (34.57%)
		Male	.481**	30	.007	0.2314 (23.14%)
	Left pubic symphysis inferior width†	Total	.665**	59	<.001	0.4422 (44.22%)
		Female	.439*	32	.012	0.1927 (19.27%)
		Male	.446*	27	.020	0.1989 (19.89%)
	Left maximum width of pubic symphysis	Total	.860**	58	<.001	0.7396 (73.96%)
		Female	.759**	33	<.001	0.5761 (57.61%)
		Male	.780**	25	<.001	0.6084 (60.84%)
	Right maximum width of pubic symphysis	Total	.909**	66	<.001	0.8263 (82.63%)
		Female	.906**	38	<.001	0.8208 (82.08%)
		Male	.829**	28	<.001	0.6872 (68.72%)

Key:

- † Measurement included for comparative reasons only
- * Correlation is significant at the 0.05 level (2-tailed)
- ** Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii)

Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group
(Pearson's product moment correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Pearson's product moment correlation coefficient			Coefficient of determination
			r	n	p value	
Left pubic symphysis inferior width	Right pubic symphysis inferior width	Total	.887**	58	<.001	0.7868 (78.68%)
		Female	.840**	31	<.001	0.7056 (70.56%)
		Male	.801**	27	<.001	0.6416 (64.16%)
	Left maximum width of pubic symphysis	Total	.812**	64	<.001	0.6593 (65.93%)
		Female	.679**	35	<.001	0.4610 (46.10%)
		Male	.692**	29	<.001	0.4789 (47.89%)
	Right maximum width of pubic symphysis	Total	.736**	57	<.001	0.5417 (54.17%)
		Female	.583**	32	<.001	0.3399 (33.99%)
		Male	.567**	25	.003	0.3215 (32.15%)
Right pubic symphysis inferior width	Left maximum width of pubic symphysis	Total	.797**	57	<.001	0.6352 (63.52%)
		Female	.741**	32	<.001	0.5491 (54.91%)
		Male	.571**	25	.003	0.3260 (32.60%)
	Right maximum width of pubic symphysis	Total	.803**	65	<.001	0.6448 (64.48%)
		Female	.720**	37	<.001	0.5184 (51.84%)
		Male	.634**	28	<.001	0.4020 (40.20%)
	Right maximum width of pubic symphysis	Total	.911**	60	<.001	0.8299 (82.99%)
		Female	.857**	34	<.001	0.7344 (73.44%)
		Male	.854**	26	<.001	0.7293 (72.93%)
Left ischial spine to symphysision	Right ischial spine to symphysision	Total	.933**	17	<.001	0.8705 (87.05%)
		Female	.960**	8	<.001	0.9216 (92.16%)
		Male	.904**	.001	<.001	0.8172 (81.72%)

Key:

** Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii) Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group
(Spearman's Rank Order correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Spearman's Rank Order correlation coefficient			Coefficient of determination
			r_s	n	p value	
Left symphyseal angle	Subpubic angle	Total	-.721**	62	<.001	0.5198 (51.98%)
		Female ²⁸	-	-	-	-
		Male ²⁹	-	-	-	-
Right symphyseal angle	Bituberous diameter	Total	-.764**	59	<.001	0.5837 (58.37%)
		Female	-.279	32	.123	0.0778 (7.78%)
		Male ³⁰	-	-	-	-
	Subpubic angle	Total	-.768**	63	<.001	0.5898 (58.98%)
		Female	-.488**	35	.003	0.2381 (23.81%)
		Male ³¹	-	-	-	-

Key:

- 28
- 29
- 30
- 31
- **
- Employment of Pearson's test. Results were $r = -.504^{**}$, $n = 35$, and $p = .002$
- Employment of Pearson's test. Results were $r = -.658^{**}$, $n = 27$, and $p = <.001$
- Employment of Pearson's test. Results were $r = -.315$, $n = 26$, and $p = .117$
- Employment of Pearson's test. Results were $r = -.576^{**}$, $n = 28$, and $p = .001$
- Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii) Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group
(Pearson's product moment correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Pearson's product moment correlation coefficient			Coefficient of determination
			r	n	p value	
Left ischium length	Right ischium length	Total	.949**	85	<.001	0.9006 (90.06%)
		Female	.895**	53	<.001	0.8010 (80.10%)
		Male	.927**	32	<.001	0.8593 (85.93%)
Left maximum length of obturator foramen	Right maximum length of obturator foramen	Total	.808**	82	<.001	0.6529 (65.29%)
		Female	.576**	51	<.001	0.3318 (33.18%)
		Male	.945**	31	<.001	0.8930 (89.30%)
Left maximum width of obturator foramen	Right maximum width of obturator foramen	Total	.891**	81	<.001	0.7939 (79.39%)
		Female ³²	-	-	-	-
		Male	.923**	32	<.001	0.8519 (85.19%)
Left auricular surface profile - a	Right auricular surface profile - a	Total	.838**	59	<.001	0.7022 (70.22%)
		Female	.754**	30	<.001	0.5685 (56.85%)
		Male	.843**	29	<.001	0.7106 (71.06%)
Right auricular surface profile - a	Right auricular surface profile – b ³³	Total	.745**	69	<.001	0.5550 (55.50%)
		Female	.719**	39	<.001	0.5170 (51.70%)
		Male	.575**	30	.001	0.3306 (33.06%)

Key:

³² Employment of Spearman's test. Results were $r_s = .869^{**}$, $n = 49$, and $p = <.001$
³³ Corresponding comparative left measurement employed Spearman's test. Results were $r_s = .712^{**}$, $n = 69$, and $p = <.001$
****** Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii) Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group
(Spearman's Rank Order correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Spearman's Rank Order correlation coefficient			Coefficient of determination
			r_s	n	p value	
Left auricular surface profile - b	Right auricular surface profile - b	Total	.890**	60	<.001	0.7921 (79.21%)
		Female	.779**	30	<.001	0.6068 (60.68%)
		Male	.904**	30	<.001	0.8172 (81.72%)
	Left auricular surface profile - d	Total	.937**	69	<.001	0.8780 (87.80%)
		Female	.831**	39	<.001	0.6906 (69.06%)
		Male	.917**	30	<.001	0.8409 (84.09%)
	Right auricular surface profile - d	Total	.869**	55	<.001	0.7552 (75.52%)
		Female	.664**	27	<.001	0.4409 (44.09%)
		Male	.824**	28	<.001	0.6790 (67.90%)

Key:

****** Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii) Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group
(Pearson's product moment correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Pearson's product moment correlation coefficient			Coefficient of determination
			r	n	p value	
Right auricular surface profile - b	Left auricular surface profile - d	Total	.806**	59	<.001	0.6496 (64.96%)
		Female	.669**	30	<.001	0.4476 (44.76%)
		Male	.808**	29	<.001	0.6529 (65.29%)
Left auricular surface profile - d	Right auricular surface profile - d	Total	.837**	66	<.001	0.7006 (70.06%)
		Female	.667**	37	<.001	0.4449 (44.49%)
		Male	.892**	29	<.001	0.7957 (79.57%)
Left auricular surface profile - e	Right auricular surface profile - d	Total	.868**	55	<.001	0.7534 (75.34%)
		Female	.791**	27	<.001	0.6257 (62.57%)
		Male	.866**	28	<.001	0.7500 (75.00%)
	Right auricular surface profile - e	Total	.742**	58	<.001	0.5506 (55.06%)
		Female	.799**	29	<.001	0.6384 (63.84%)
		Male	.703**	29	<.001	0.4942 (49.42%)

Key:

**** Correlation is significant at the 0.01 level (2-tailed)**

7.5.2(ii) Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group (Spearman's Rank Order correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Spearman's Rank Order correlation coefficient			Coefficient of determination
			r _s	n	p value	
Left sciatic notch height	Right sciatic notch height	Total	.911**	15	<.001	0.8299 (82.99%)
		Female ³⁴	-	-	-	-
		Male	.929**	11	<.001	0.8630 (86.30%)

Key:

³⁴

Employment of Pearson's test. Results were r = .800, n = 4, and p = .200

**

Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii)

Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group
(Pearson's product moment correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Pearson's product moment correlation			Coefficient of determination
			r	n	p value	
Antero-posterior inferior diameter of pelvis	Greatest pelvic diameter	Total	.738**	39	<.001	0.5446 (54.46%)
		Female ³⁵	-	-	-	-
		Male ³⁶	-	-	-	-
	Right ischial spine to sacral apex	Total	.822**	15	<.001	0.6757 (67.57%)
		Female	.889**	6	.018	0.7903 (79.03%)
		Male ³⁷	-	-	-	-
	Left ischial spine to sacral apex	Total	.860**	24	<.001	0.7396 (73.96%)
		Female	.811**	12	.001	0.6577 (65.77%)
		Male ³⁸	-	-	-	-
	Left ischial tuberosity to sacral apex ³⁹	Total	.830**	37	<.001	0.6889 (68.89%)
		Female	.795**	19	<.001	0.6320 (63.20%)
		Male ⁴⁰	-	-	-	-
	Bi-acetabular breadth	Total	.771**	38	<.001	0.5944 (59.44%)
		Female	.727**	19	<.001	0.5285 (52.85%)
		Male ⁴¹	-	-	-	-

Key:

**

Correlation is significant at the 0.01 level (2-tailed)

35

Employment of Spearman's test. Results were $r_s = .241$, $n = 20$, and $p = .307$

36

Employment of Spearman's test. Results were $r_s = .725^{**}$, $n = 19$, and $p = <.001$

37

Employment of Spearman's test. Results were $r_s = <.001$, $n = 9$, and $p = 1.000$

38

Employment of Spearman's test. Results were $r_s = .343$, $n = 12$, and $p = .276$

39

Corresponding comparative left measurement employed Spearman's test. Results were $r_s = .330^{*}$, $n = 37$, and $p = .046$

40

Employment of Spearman's test. Results were $r_s = .608^{**}$, $n = 18$, and $p = .007$

41

Employment of Spearman's test. Results were $r_s = .367$, $n = 19$, and $p = .123$

7.5.2(ii) Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group
(Pearson's product moment correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Pearson's product moment correlation coefficient			Coefficient of determination
			r	n	p value	
Transverse diameter of pelvis	Left ischial spine to sacral apex	Total	.740**	22	<.001	0.5476 (54.76%)
		Female	.574	11	.065	0.3295 (32.95%)
		Male	.559	11	.074	0.3125 (31.25%)
	Right ischial spine to sacral apex [†]	Total	.693**	.004	<.001	0.4802 (48.02%)
		Female	.954**	6	.003	0.9101 (91.01%)
		Male	.436	9	.240	0.1901 (19.01%)
	Inlet circumference	Total	.805**	59	<.001	0.6480 (64.80%)
		Female	.801**	33	<.001	0.6416 (64.16%)
		Male ⁴²	-	-	-	-
	Bi-acetabular breadth	Total	.813**	67	<.001	0.6610 (66.10%)
		Female	.805**	37	<.001	0.6480 (64.80%)
		Male	.651**	30	<.001	0.4238 (42.38%)

Key:

- † Measurement included for comparative reasons only
- ⁴² Employment of Spearman's test. Results were $r_s = .753^{**}$, $n = 26$, and $p = <.001$
- ** Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii)

Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group
(Pearson's product moment correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Pearson's product moment correlation coefficient			Coefficient of determination
			r	n	p value	
Bispinous breadth	Bi-tuberous width	Total	.868**	17	<.001	0.7534 (75.34%)
		Female	.954**	7	.001	0.9101 (91.01%)
		Male	.815**	10	.004	0.6642 (66.42%)
	Right ischial spine to sacral apex	Total	.917**	14	<.001	0.8409 (84.09%)
		Female	.835*	6	.039	0.6972 (69.72%)
		Male	.954**	8	.000	0.9101 (91.01%)
	Left ischial spine to sacral apex	Total	.939**	14	<.001	0.8817 (88.17%)
		Female	.958**	6	.003	0.9178 (91.78%)
		Male	.744*	8	.034	0.5535 (55.35%)
	Subpubic angle	Total	.770**	18	<.001	0.5929 (59.29%)
		Female	.736	7	.060	0.5417 (54.17%)
		Male	.507	11	.112	0.2570 (25.70%)
Bi-tuberous diameter	Bi-acetabular breadth	Total	.839**	16	<.001	0.7039 (70.39%)
		Female	.904*	5	.035	0.8172 (81.72%)
		Male	.612*	11	.045	0.3745 (37.45%)
	Subpubic angle	Total	.853**	60	<.001	0.7276 (72.76%)
		Female	.698**	34	<.001	0.4872 (48.72%)
		Male	.746**	26	<.001	0.5565 (55.65%)

Key:

- * Correlation is significant at the 0.05 level (2-tailed)
- ** Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii)

Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group
(Pearson's product moment correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Pearson's product moment correlation coefficient			Coefficient of determination
			r	n	p value	
Bi-tuberous width	Right ischial spine to sacral apex	Total	.782**	14	.001	0.6115 (61.15%)
		Female	.720	6	.107	0.5184 (51.84%)
		Male	.755*	8	.030	0.5700 (57.00%)
	Left ischial spine to sacral apex	Total	.873**	21	<.001	0.7621 (76.21%)
		Female	.847**	11	.001	0.7174 (71.74%)
		Male	.808**	10	.005	0.6529 (65.29%)
	Bi-acetabular breadth	Total	.840**	61	<.001	0.7056 (70.56%)
		Female	.785**	34	<.001	0.6162 (61.62%)
		Male	.826**	27	<.001	0.6823 (68.23%)
Right ischial spine to sacral apex	Left ischial spine to sacral apex	Total	.907**	14	<.001	0.8226 (82.26%)
		Female	.873*	6	.023	0.7621 (76.21%)
		Male	.747*	8	.033	0.5580 (55.80%)
	Subpubic angle	Total	.809**	15	<.001	0.6545 (65.45%)
		Female	.647	6	.165	0.4186 (41.86%)
		Male	.496	9	.175	0.2460 (24.60%)
	Bi-acetabular breadth	Total	.875**	13	<.001	0.7656 (76.56%)
		Female	.930	4	.070	0.8649 (86.49%)
		Male	.718*	9	.029	0.5155 (51.55%)
Left ischial spine to sacral apex	Subpubic angle	Total	.712**	24	.001	0.5069 (50.69%)
		Female	.381	12	.222	0.1452 (14.52%)
		Male	.239	12	.454	0.0571 (5.71%)
	Bi-acetabular breadth	Total	.930**	22	<.001	0.8649 (86.49%)
		Female	.849**	10	.002	0.7208 (72.08%)
		Male	.870**	12	<.001	0.7569 (75.69%)

Key:

- * Correlation is significant at the 0.05 level (2-tailed)
- ** Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii)

Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group (Spearman's Rank Order correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Spearman's Rank Order correlation coefficient		
			r_s	n	p value
Right ischial tuberosity to sacral apex	Left ischial tuberosity to sacral apex	Total	.895**	14	<.001
		Female	.771	6	.072
		Male	.667	8	.071

Key:

** Correlation is significant at the 0.01 level (2-tailed)

7.5.2(ii)

Test of association between selected measurements in the sacrum, innominate and reconstructed pelvis by sample/group (Pearson's product moment correlation coefficient) (contd.)

Variable 1	Variable 2	Sample/group	Pearson's product moment correlation coefficient			Coefficient of determination
			r	n	p value	
Inlet circumference	Bi-acetabular breadth	Total	.777**	56	<.001	0.6037 (60.37%)
		Female	.834**	30	<.001	0.6956 (69.56%)
		Male ⁴³	-	-	-	-

Key:

⁴³

Employment of Spearman's test. Results were $r_s = .584^{**}$, $n = 26$, and $p = .002$

** Correlation is significant at the 0.01 level (2-tailed)

Appendix 9

**Kolmogorov-Smirnov tests of normality
for absolute differences in paired
measurements**

**Tests of correlation between age and
absolute differences in paired
measurements**

Table 7.6(i) Kolmogorov-Smirnov test of normality for absolute differences between left and right innominate measurements

Variable (absolute difference between left and right values)	Group	Kolmogorov-Smirnov Statistic	Degrees of freedom	p value	Normal distribution
Maximum innominate length	Female	.286	53	<0.001	✗
	Male	.248	32	<0.001	✗
Innominate breadth	Female	.213	40	<0.001	✗
	Male	.231	34	<0.001	✗
Iliac height	Female	.124	55	.035	✗
	Male	.148	35	.051	✓
Acetabulum diameter	Female	.118	53	.065	✓
	Male	.114	34	.200	✓
Pubis length	Female	.120	31	.200	✓
	Male	.191	25	.020	✗
Minimum height of inferior pubic ramus	Female	.257	47	<0.001	✗
	Male	.161	33	.029	✗
Oblique length of inferior pubic ramus	Female	.243	41	<0.001	✗
	Male	.174	31	.017	✗
Tubercolusymphyseal height	Female	.158	18	.200	✓
	Male	.237	21	.003	✗
Pubic acetabular length	Female	.130	32	.180	✓
	Male	.170	25	.061	✓
Pubic tubercle- acetabular length	Female	.405	18	<0.001	✗
	Male	.116	21	.200	✓
Ischial acetabular height	Female	.112	54	.091	✓
	Male	.143	32	.092	✓
Pubo-sacroiliac diameter	Female	.151	30	.078	✓
	Female	.164	23	.110	✓

Table 7.6(i) Kolmogorov-Smirnov test of normality for absolute differences between left and right innominate measurements (contd.)

Variable (absolute difference between left and right values)	Group	Kolmogorov-Smirnov Statistic	Degrees of freedom	p value	Normal distribution
Pubic symphysis depth	Male	.179	32	.010	✗
	Female	.183	27	.020	✗
Pubic symphysis superior width	Male	.167	32	.023	✗
	Female	.153	27	.105	✓
Pubic symphysis inferior width	Male	.143	31	.105	✓
	Female	.150	27	.120	✓
Maximum width of pubic symphysis	Male	.165	34	.020	✗
	Female	.360	27	<0.001	✗
Ischial spine to symphysis	Male	.232	9	.178	✓
	Female	.166	9	.200	✓
Symphyseal angle	Female	.155	39	.020	✗
	Male	.125	28	.200	✓
Acetabulosciatic breadth	Female	.387	59	<0.001	✗
	Male	.130	35	.139	✓
Ischium length	Female	.118	53	.064	✓
	Male	.180	32	.010	✗
Maximum length of obturator foramen	Female	.309	51	<0.001	✗
	Male	.224	31	<0.001	✗
Maximum width of obturator foramen	Female	.128	49	.043	✗
	Male	.145	32	.087	✓
Auricular surface profile – a	Female	.155	30	.064	✓
	Male	.122	29	.200	✓
Auricular surface profile – b	Female	.169	30	.029	✗
	Male	.197	30	.004	✗
Auricular surface profile – c	Female	.146	52	.007	✗
	Male	.106	34	.200	✓

Table 7.6(i) Kolmogorov-Smirnov test of normality for absolute differences between left and right innominate measurements (contd.)

Variable (absolute difference between left and right values)	Group	Kolmogorov-Smirnov Statistic	Degrees of freedom	p value	Normal distribution
Auricular surface profile – d	Female	.157	27	.086	✓
	Male	.158	28	.072	✓
Auricular surface profile – e	Female	.149	29	.096	✓
	Male	.173	29	.026	✗
Auricular surface profile – f	Female	.151	27	.115	✓
	Male	.093	28	.200	✓
Sciatic notch width	Female	.247	5	.200	✓
	Male	.132	12	.200	✓
Sciatic notch height	Female	.440	5	.002	✗
	Male	.236	11	.087	✓
Sciatic notch position	Female	.290	5	.197	✓
	Male	.235	11	.092	✓

Table 7.6(iii) Kolmogorov-Smirnov test of normality for absolute differences between left and right reconstructed pelvis measurements

Variable (absolute difference between left and right values)	Group	Kolmogorov-Smirnov Statistic	Degrees of freedom	p value	Normal distribution
Ischial spine to sacral apex	Female	.264	6	.200	✓
	Male	.180	8	.200	✓
Ischial tuberosity to sacral apex	Female	.149	20	.200	✓
	Male	.287	18	<0.001	✗

Table 7.6(iv) Independent samples t-test for difference in left and right innominate measurements between female and male groups

Variable	t-test for equality of means*			Difference in means	Eta squared
	t	df	p value		
Acetabulum diameter	-.914	85	.363	No	0.0097 (0.97%)
Pubic acetabular length	.349	55	.728	No	0.0022 (0.22%)
Ischial acetabular height	-.357	84	.722	No	0.0015 (0.15%)
Pubo-sacroiliac diameter	.317	51	.753	No	0.0020 (0.20%)
Pubic symphysis inferior width	-.168	56	.867	No	0.0005 (0.05%)
Ischial spine to symphysis	-.706†	13.894	.492	No	0.0346 (3.46%)
Auricular surface profile - a	-.120	57	.905	No	0.0003 (0.03%)
Auricular surface profile - d	-.138	53	.891	No	0.0004 (0.04%)
Auricular surface profile - f	.453	53	.653	No	0.0039 (0.39%)
Sciatic notch width	.370	15	.716	No	0.0090 (0.90%)
Sciatic notch position	.940	14	.363	No	0.0594 (5.94%)

Key:

- † Equal variances not assumed
- * $H_0 \quad x_d = 0 \quad H_1 \quad x_d \neq 0$ (Two-tailed test)

Table 7.6(v)

Mann-Whitney U test for difference in left and right innominate measurements between female and male groups

Variable	Mann-Whitney U test*		Difference in medians
	z	p value	
Maximum innominate length (cm)	-.394	.693	No
Innominate breadth (cm)	-1.504	.133	No
Iliac height	-.745	.456	No
Pubis length	-1.681	.093	No
Minimum height of inferior pubic ramus	-.762	.446	No
Oblique length of inferior pubic ramus	-.961	.337	No
Tubercolusymphyseal height	-1.197	.231	No
Pubic tubercle-acetabular length	-.211	.833	No
Pubic symphysis depth	-.320	.749	No
Pubic symphysis superior width	-.898	.369	No
Maximum width of pubic symphysis	-.457	.647	No
Symphyseal angle	-.288	.773	No
Acetabulosciatic breadth	-.618	.537	No
Ischium length	-.989	.323	No
Maximum length of obturator foramen	-1.650	.099	No
Maximum width of obturator foramen	-.425	.671	No
Auricular surface profile - b	-.037	.971	No
Auricular surface profile - c	-.362	.717	No
Auricular surface profile - e	-1.104	.270	No
Sciatic notch height	-.283	.777	No

Key:

† Equal variances not assumed
* $H_0 \theta_d = 0$ $H_1 \theta_d \neq 0$ (Two-tailed test)

Table 7.6(vi) Independent samples t-test and Mann Whitney U test for difference in left and right reconstructed pelvis measurements between female and male groups

Variable	t-test for equality of means*			Difference in means	Eta squared
	t	df	p value		
Ischial spine to sacral apex	.628	12	.542	No	0.0318 (3.18%)

Key:

* $H_0 \bar{x}_d = 0 \quad H_1 \bar{x}_d \neq 0$ (Two-tailed test)

Variable	Mann-Whitney U test**		Difference in medians
	z	p value	
Ischial tuberosity to sacral apex	-1.155	.248	No

Key:

** $H_0 \theta_d = 0 \quad H_1 \theta_d \neq 0$ (Two-tailed test)

**Table 7.6(viii) Test of association between age and absolute difference in left and right innominate measurements
(Spearman's Rank Order Correlation)**

Variable	Sample	Spearman's Rank Order correlation coefficient			Coefficient of determination
		r _s	n	p value	
Maximum innominate length (cm)	Total	-.062	85	.572	0.0038 (0.38%)
	Female	-.075	53	.595	0.0056 (0.56%)
	Male	-.042	32	.819	0.0018 (0.18%)
Innominate breadth (cm)	Total	-.001	74	.996	<0.0001 (<0.01%)
	Female	.181	40	.264	0.0328 (3.28%)
	Male	-.183	34	.299	0.0335(3.35%)
Iliac height	Total	.152	90	.152	0.0231 (2.31%)
	Female	.059	55	.671	0.0035 (0.35%)
	Male	.341*	35	.045	0.1163 (11.63%)
Acetabulum diameter	Total	.011	87	.923	0.0001 (0.01%)
	Female	-.058	53	.682	0.0034 (0.34%)
	Male	.181	34	.307	0.0328 (3.28%)
Pubis length	Total	.013	56	.925	0.0002 (0.02%)
	Female	.063	31	.736	0.0040 (0.40%)
	Male	-.021	25	.920	0.0004 (0.04%)
Minimum height of inferior pubic ramus	Total	.091	80	.424	0.0083 (0.83%)
	Female	.026	47	.863	0.0007 (0.07%)
	Male	.133	33	.460	0.0177 (1.77%)
Oblique length of inferior pubic ramus	Total	-.038	72	.751	0.0014 (0.14%)
	Female	-.024	41	.880	0.0006 (0.06%)
	Male	-.055	31	.768	0.0030 (0.30%)
Tubercolusymphyseal height	Total	.034	39	.839	0.0012 (0.12%)
	Female	.062	18	.807	0.0038 (0.38%)
	Male	.012	21	.958	0.0001 (0.01%)

Key:

* Correlation is significant at the 0.05 level (2-tailed)

**Table 7.6(viii) Test of association between age and absolute difference in left and right innominate measurements
(Spearman's Rank Order Correlation) (contd.)**

Variable	Sample	Spearman's Rank Order correlation coefficient			Coefficient of determination
		r_s	n	p value	
Pubic acetabular length	Total	-.044	57	.743	0.0019 (0.19%)
	Female	-.159	32	.384	0.0253 (2.53%)
	Male	.028	25	.894	0.0008 (0.08%)
Pubic tubercle-acetabular length	Total	.037	39	.825	0.0014 (0.14%)
	Female	.203	18	.419	0.0412 (4.12%)
	Male	-.153	21	.507	0.0234 (2.34%)
Ischial acetabular height	Total	.008	86	.943	0.0001 (0.01%)
	Female	.061	54	.661	0.0037 (0.37%)
	Male	-.085	32	.644	0.0072 (0.72%)
Pubo-sacroiliac diameter	Total	.075	53	.594	0.0056 (0.56%)
	Female	-.009	30	.962	0.0001 (0.01%)
	Male	.147	23	.503	0.0216 (2.16%)
Pubic symphysis depth	Total	-.006	59	.965	<0.0001 (<0.01%)
	Female	-.143	32	.435	0.0204 (2.04%)
	Male	.051	27	.799	0.0026 (0.26%)
Pubic symphysis superior width	Total	-.053	59	.693	0.0028 (0.28%)
	Female	-.150	32	.412	0.0225 (2.25%)
	Male	.071	27	.724	0.0050 (0.50%)
Pubic symphysis inferior width	Total	.117	58	.380	0.0137 (1.37%)
	Female	.171	31	.356	0.0292 (2.92%)
	Male	.045	27	.825	0.0020 (0.20%)
Maximum width of pubic symphysis	Total	-.038	61	.772	0.0014 (0.14%)
	Female	-.132	34	.458	0.0174 (1.74%)
	Male	.088	27	.662	0.0077 (0.77%)

Table 7.6(viii) Test of association between age and absolute difference in left and right innominate measurements
(Spearman's Rank Order Correlation) (contd.)

Variable	Sample	Spearman's Rank Order correlation coefficient			Coefficient of determination
		r _s	n	p value	
Ischial spine to symphysision	Total	.570*	18	.014	0.3249 (32.49%)
	Female	.783*	9	.013	0.6131 (61.31%)
	Male	.351	9	.354	0.1232 (12.32%)
Symphyseal angle	Total	-.028	67	.822	0.0008 (0.08%)
	Female	-.001	39	.997	<0.0001 (<0.01%)
	Male	-.118	28	.551	0.0139 (1.39%)
Acetabulosciatic breadth	Total	-.014	94	.892	0.0002 (0.02%)
	Female	-.032	59	.810	0.0010 (0.10%)
	Male	.014	35	.938	0.0002 (0.02%)
Ischium length	Total	-.292**	85	.007	0.0853 (8.53%)
	Female	-.318*	53	.020	0.1011 (10.11%)
	Male	-.272	32	.133	0.0740 (7.40%)
Maximum length of obturator foramen	Total	-.044	82	.693	0.0019 (0.19%)
	Female	-.046	51	.746	0.0021 (0.21%)
	Male	.078	31	.677	0.0061 (0.61%)
Maximum width of obturator foramen	Total	.138	81	.219	0.0190 (1.90%)
	Female	.047	49	.749	0.0022 (0.22%)
	Male	.275	32	.128	0.0756 (7.56%)
Auricular surface profile - a	Total	.222	59	.090	0.0493 (4.93%)
	Female	.070	30	.712	0.0049 (0.49%)
	Male	.386*	29	.039	0.1490 (14.90%)
Auricular surface profile - b	Total	.024	60	.855	0.0006 (0.06%)
	Female	-.048	30	.802	0.0023 (0.23%)
	Male	.090	30	.635	0.0081 (0.81%)

Key:

* Correlation is significant at the 0.05 level (2-tailed) ** Correlation is significant at the 0.01 level (2-tailed)

**Table 7.6(viii) Test of association between age and absolute difference in left and right innominate measurements
(Spearman's Rank Order Correlation) (contd.)**

Variable	Sample	Spearman's Rank Order correlation coefficient			Coefficient of determination
		r _s	n	p value	
Auricular surface profile - c	Total	-.076	86	.488	0.0058 (0.58%)
	Female	-.158	52	.263	0.0250 (2.50%)
	Male	.082	34	.647	0.0067 (0.67%)
Auricular surface profile - d	Total	-.002	55	.988	<0.0001 (<0.01%)
	Female	.013	27	.949	0.0002 (0.02%)
	Male	.059	28	.764	0.0035 (0.35%)
Auricular surface profile - e	Total	.186	58	.161	0.0346 (3.46%)
	Female	.239	29	.213	0.0571 (5.71%)
	Male	.024	29	.902	0.0006 (0.06%)
Auricular surface profile - f	Total	.062	55	.655	0.0038 (0.38%)
	Female	-.032	27	.875	0.0010 (0.10%)
	Male	.219	28	.264	0.0480 (4.80%)
Sciatic notch width	Total	.025	17	.925	0.0006 (0.06%)
	Female	-.300	5	.624	0.0900 (9.00%)
	Male	.179	12	.578	0.0320 (3.20%)
Sciatic notch height	Total	-.031	16	.909	0.0010 (0.10%)
	Female	-.300	5	.624	0.0900 (9.00%)
	Male	.096	11	.780	0.0092 (0.92%)
Sciatic notch position	Total	-.074	16	.786	0.0055 (0.55%)
	Female	-.500	5	.391	0.2500 (25.00%)
	Male	.232	11	.492	0.0538 (5.38%)

**Table 7.6(ix) Test of association between age and absolute difference in left and right reconstructed pelvis measurements
(Spearman's Rank Order Correlation)**

Variable	Sample	Spearman's Rank Order correlation coefficient			Coefficient of determination
		r _s	n	p value	
Ischial spine to sacral apex	Total	.543*	14	.045	0.2948 (29.48%)
	Female	.638	6	.173	0.4070 (40.70%)
	Male	.431	8	.286	0.1858 (18.58%)
Ischial tuberosity to sacral apex	Total	.164	38	.324	0.0269 (2.69%)
	Female	.242	20	.305	0.0586 (5.86%)
	Male	.130	18	.608	0.0169 (1.69%)

Key:

***** Correlation is significant at the 0.05 level (2-tailed)

Appendix 10

Instructions for accessing appendices on CD-ROM

10.1 Content of CD-ROM

The accompanying CD-ROM contains three appendices. The first of these, CD1, contains the SPSS data file that was employed for all statistical analyses. Appendices CD2 and CD3 comprise the data generated from statistical tests undertaken to investigate the relationship between pelvic shape and size, as well as the programmes required to run the 'signpost' configurations. The structure of the appendices is presented in Figure A1.

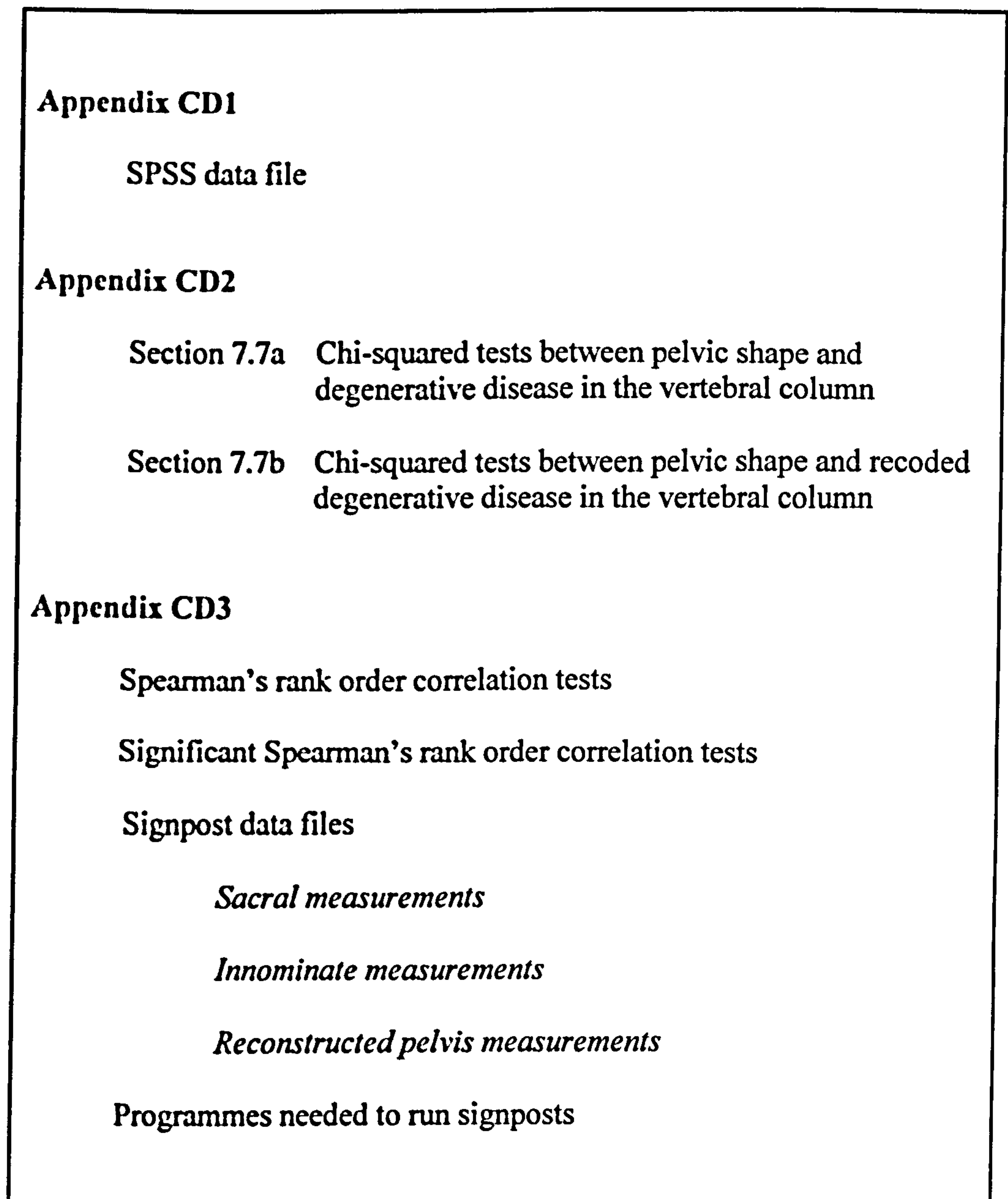


Figure A1 Structure of folders in Appendices on CD-ROM

10.2 Hardware and software requirements for Microsoft Windows

- A personal computer running a recent version of Microsoft® Windows™ (e.g. Windows XP) and incorporating a CD-ROM drive and VGA display.
- A web browser capable of viewing HTML files, e.g. Internet Explorer

10.3 Installation for Microsoft Windows

- Start Microsoft Windows
- Place the *PhD Appendices* disc in the CD-ROM drive.
- View the CD-ROM drive in File Explorer
The three appendices (CD1, CD2 and CD3) contained on this disc will be listed.

a) To view Appendix CD1 - SPSS data editor for PhD

- To view the SPSS data editor, open the Appendix CD1 folder and double click on the SPSS data editor for PhD.sav file.

b) To view Appendix CD2 — Chi-squared tests of association between pelvic shape and degenerative disease in the vertebral column

- To view the chi-squared tests of association between pelvic shape and degenerative disease in the vertebral column, open the Appendix CD2 folder and double click on index.htm file.
- The chi-squared tests performed on the original and then recoded variables are presented in Section 7.7a and 7.7b respectively.

- Each of these sections lists the areas of the vertebral column examined. By double clicking on one of these, the chi-squared tests will be shown for each of the six degenerative disease indicators studied.
- Double click on any degenerative disease indicator file to open the SPSS output generated from all chi-squared tests undertaken.

c) To view Appendix CD3 - Tests of correlation between measurements in the sacrum, innominate and reconstructed pelvis and degenerative disease in the vertebral column

- To view the tests of correlation between measurements in the sacrum, innominate and reconstructed pelvis and degenerative disease in the vertebral column, open Appendix CD3.
Data is contained within four folders: Spearman's rank order correlation tests, Significant Spearman's rank order correlation tests, Signpost data files and Programmes needed to run signposts.

Spearman's rank order correlation tests

- To view all of the Spearman's rank order correlation tests undertaken, double click on this folder. Twenty-six subfolders, representing each of the levels examined in the vertebral column from the occipital condyles (superior aspect) through to the first sacral vertebra (inferior aspect), will be revealed.
- Double clicking on one of these subfolders will show six HTM (hypertext markup language) files, each representing a group of measurements taken - one each for the sacral and reconstructed pelvis measurements and a further four for the innominate measurements.

- Double clicking on one of these HTM files will open the SPSS generated outputs for the Spearman's rank order correlation tests that were undertaken.
- To close the HTM files, click on the 'Close' button at the top right of the screen.

Significant results of Spearman's rank order correlation tests

- To view the significant results of the Spearman's rank order correlation tests, double click on this folder. Twenty-six subfolders, representing each of the levels examined in the vertebral column from the occipital condyles (superior aspect) through to the first sacral vertebra (inferior aspect), will be revealed.
- Double clicking on one of these folders will show a word document and double clicking on this will open the tabulated significant correlations generated from the Spearman's rank order correlation tests.
- To close the word files, click on the 'Close' button at the top right of the screen.

Signpost data files

- To view the signpost data files, double click on this folder. Three subfolders will be revealed for each of the pelvic skeletal areas that measurements were taken from, namely the sacrum, innominate and reconstructed pelvis.
- Double clicking on one of these folders will show a list of folders for each of the individual measurements observed in that particular skeletal area.

- Double clicking on one of these measurements will reveal a further 12 subfolders representing each of the vertebral areas examined for evidence of degenerative change.
- Double clicking on one of these subfolders will show two files: an excel spreadsheet (.xls) and a data file (.DAT).
Double clicking on the excel (.xls) file will show the significant correlations coefficients for the vertebral level and degenerative indicator concerned. To close the excel files, click on the 'Close' button at the top right of the screen.
The data (.DAT) files are only stored here and are not directly accessible from this point. They must be accessed by using a specific programme that is detailed further in the next section.
- Navigation back up directory levels is effected by either clicking on the 'Back' or 'Up' buttons on the main tool bar

Programmes needed to run signposts

- Double clicking on this folder will reveal six files. These are required to run and view the signpost configurations. The only one that is of direct concern for viewing the signpost configurations is sp.exe.
- To view the signposts, double click on the sp.exe file.
- This will open a window that allows the data (.DAT) files to be opened. Use the navigation buttons to locate and select the signpost data file that is to be viewed and open it.
- The signpost configuration will be revealed. The signpost can be viewed from various angles by pressing the cursors keys: left to move left, right to move right, up to move superiorly and down to move inferiorly. The cursor keys can be used in combination to fully gain an appreciation of the interrelationship between the variables under study.

- To close the configuration window, press the escape key. The procedure can then be repeated by double clicking on the sp.exe file again.

Appendix 11

**SPSS generated output for
discriminant function analysis**

Analysis Case Processing Summary

Unweighted Cases		N	Percent
Valid		30	29.1
Excluded	Missing or out-of-range group codes	0	.0
	At least one missing discriminating variable	73	70.9
	Both missing or out-of-range group codes and at least one missing discriminating variable	0	.0
	Total	73	70.9
Total		103	100.0

Group Statistics

OSGROUP		Valid N (listwise)	
		Unweighted	Weighted
Minimum expression	S1_T	15	15.000
	S1_AU	15	15.000
	S1_BF	15	15.000
	S1_BG	15	15.000
Moderate expression	S1_T	13	13.000
	S1_AU	13	13.000
	S1_BF	13	13.000
	S1_BG	13	13.000
Severe expression	S1_T	2	2.000
	S1_AU	2	2.000
	S1_BF	2	2.000
	S1_BG	2	2.000
Total	S1_T	30	30.000
	S1_AU	30	30.000
	S1_BF	30	30.000
	S1_BG	30	30.000

Summary of Canonical Discriminant Functions

Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	1.472 ^a	93.2	93.2	.772
2	.107 ^a	6.8	100.0	.311

^a First 2 canonical discriminant functions were used in the analysis.

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1 through 2	.365	25.679	8	.001
2	.903	2.600	3	.457

Standardized Canonical Discriminant Function Coefficients

	Function	
	1	2
S1_T	.276	.535
S1_AU	.371	.379
S1_BF	.213	-1.690
S1_BG	.572	1.162

Structure Matrix

	Function	
	1	2
S1_BF	.852*	-.503
S1_BG	.848*	-.192
S1_AU	.561*	.141
S1_T	.453	.596*

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions

Variables ordered by absolute size of correlation within function.

* Largest absolute correlation between each variable and any discriminant function

Functions at Group Centroids

OSGROUP	Function	
	1	2
Minimum expression	-1.151	7.022E-03
Moderate expression	1.136	-.179
Severe expression	1.244	1.113
Unstandardized canonical discriminant functions evaluated at group means		

Classification Statistics

Classification Processing Summary

Processed		103
Excluded	Missing or out-of-range group codes	0
	At least one missing discriminating variable	73
Used in Output		30

Prior Probabilities for Groups

OSGROUP	Prior	Cases Used in Analysis	
		Unweighted	Weighted
Minimum expression	.333	15	15.000
Moderate expression	.333	13	13.000
Severe expression	.333	2	2.000
Total	1.000	30	30.000

Casewise Statistics

		Actual Group	Highest Group				Second Highest Group			Discriminant Scores		
			Predicted Group	P(D>d G=g)	P(G=g D=d)	Squared Mahalanobis Distance to Centroid	Group	P(G=g D=d)	Squared Mahalanobis Distance to Centroid	Function 1	Function 2	
Case Number				p	df							
Original	4	1	1	.644	2	.988	.879	2	.008	10.448	-2.085	.091
	6	2	3**	.764	2	.501	.538	2	.395	1.015	.640	.698
	9	2	2	.805	2	.690	.434	3	.299	2.110	1.793	-.231
	11	1	1	.040	2	.897	6.452	2	.101	10.811	-1.160	-2.533
	13	1	1	.757	2	.973	.556	2	.016	8.800	-1.768	.425
	14	2	1**	.556	2	.676	1.172	2	.280	2.938	-.453	-.821
	16	1	1	.509	2	.992	1.350	2	.007	11.252	-2.204	-.483
	17	2	1**	.603	2	.495	1.012	2	.357	1.662	-.151	-.103
	22	2	3**	.754	2	.641	.564	2	.257	2.392	.503	1.232
	27	1	1	.744	2	.983	.592	2	.012	9.337	-1.917	-.060
	30	1	1	.560	2	.724	1.161	2	.241	3.360	-.554	-.890
	32	1	1	.862	2	.964	.297	2	.028	7.355	-1.571	-.339
	33	2	1**	.714	2	.591	.674	2	.277	2.189	-.330	.019
	40	1	1	.120	2	.997	4.239	3	.002	16.867	-2.862	1.152
	42	1	1	.885	2	.959	.245	2	.026	7.486	-1.560	.285
	45	1	1	.823	2	.739	.390	2	.149	3.589	-.667	.402
	55	1	1	.826	2	.724	.382	2	.205	2.906	-.568	-.199
	65	1	2**	.875	2	.541	.268	3	.364	1.061	.779	.195
	68	2	2	.465	2	.665	1.532	3	.332	2.918	2.374	-.168
	69	2	2	.063	2	.950	5.521	1	.030	12.423	1.303	-2.523
	71	2	3**	.451	2	.557	1.591	2	.441	2.056	2.372	.548
	73	2	2	.979	2	.640	.043	3	.286	1.653	.934	-.134
	81	1	3**	.230	2	.754	2.940	1	.157	6.081	-.065	2.221
	83	2	2	.694	2	.828	.731	3	.118	4.629	1.105	-1.034
	84	2	3**	.757	2	.595	.558	2	.399	1.354	1.878	.717
	88	1	1	.928	2	.838	.150	2	.098	4.448	-.914	.313
	89	3	3	.695	2	.863	.728	2	.125	4.599	1.184	1.965
	90	2	2	.234	2	.752	2.904	3	.246	5.137	2.804	-.532
	91	1	1	.538	2	.504	1.241	2	.395	1.730	-.146	-.473
	92	3	2**	.894	2	.546	.223	3	.425	.728	1.305	.262

For the original data, squared Mahalanobis distance is based on canonical functions. For the cross-validated data, squared Mahalanobis distance is based on observations.

** Misclassified case

^a Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.

Casewise Statistics (contd.)

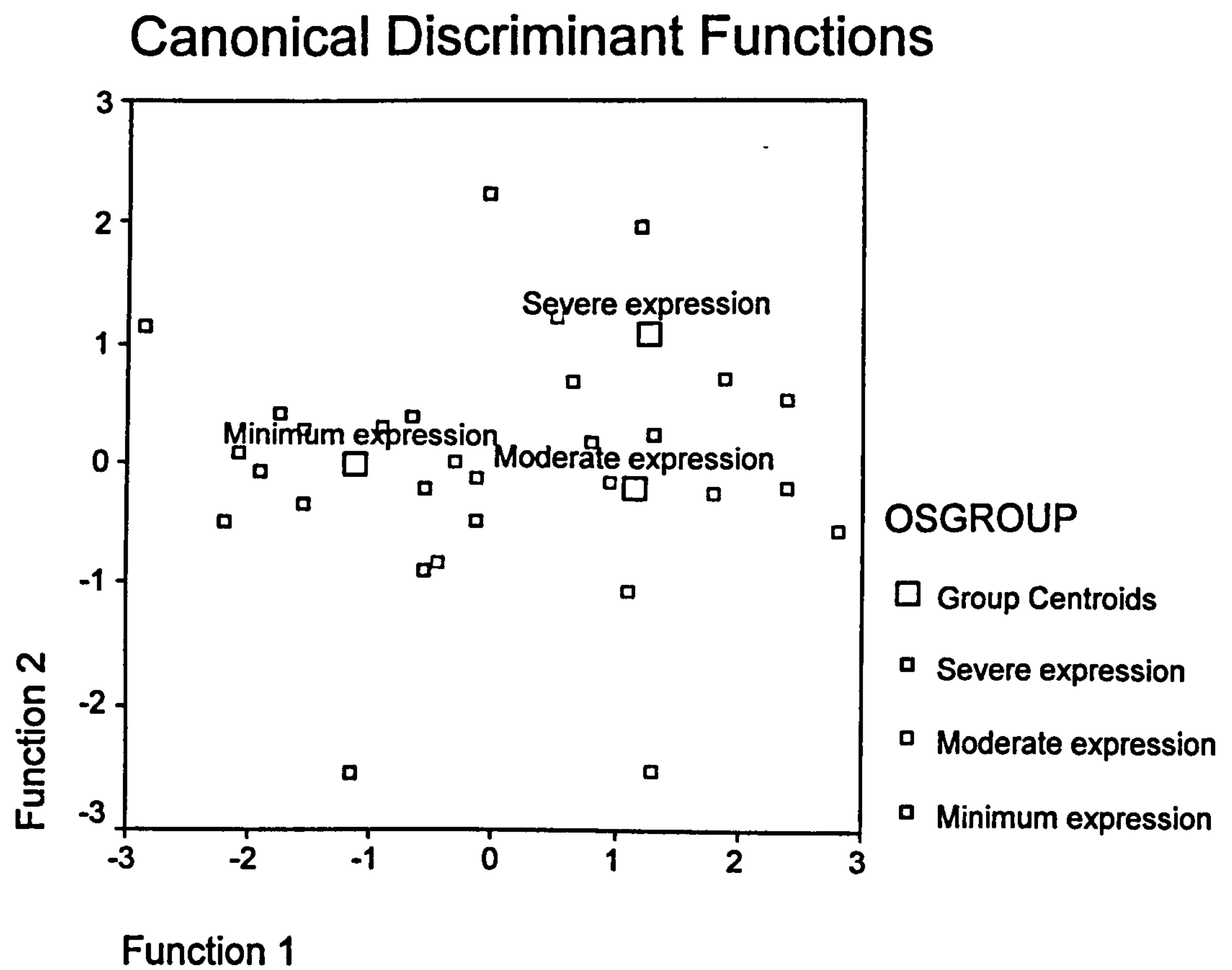
	Case Number	Actual Group	Predicted Group	Highest Group			Second Highest Group			Discriminant Scores	
				P(D>d G=g)	P(G=g D=d)	Squared Mahalanobis Distance to Centroid	Group	P(G=g D=d)	Squared Mahalanobis Distance to Centroid	Function 1	Function 2
				p	df						
Cross-validated ^a	4	1	1	.162	4	.988	6.545	2	.008	16.108	
	6	2	3**	.906	4	.531	1.024	2	.352	1.845	
	9	2	2	.203	4	.584	5.947	3	.405	6.679	
	11	1	1	.011	4	.741	13.094	2	.258	15.206	
	13	1	1	.922	4	.969	.919	2	.018	8.922	
	14	2	1**	.793	4	.784	1.687	2	.180	4.628	
	16	1	1	.461	4	.992	3.614	2	.007	13.495	
	17	2	1**	.032	4	.885	10.556	3	.067	15.706	
	22	2	3**	.958	4	.684	.645	2	.200	3.106	
	27	1	1	.601	4	.981	2.748	2	.014	11.272	
	30	1	1	.349	4	.613	4.449	2	.340	5.626	
	32	1	1	.350	4	.955	4.437	2	.036	10.973	
	33	2	1**	.334	4	.807	4.573	2	.098	8.786	
	40	1	1	.088	4	.998	8.094	3	.001	21.193	
	42	1	1	.503	4	.949	3.341	2	.031	10.153	
	45	1	1	.173	4	.580	6.367	2	.229	8.222	
	55	1	1	.921	4	.698	.927	2	.221	3.224	
	65	1	2**	.969	4	.566	.547	3	.382	1.334	
	68	2	2	.264	4	.562	5.238	3	.436	5.746	
	69	2	2	.028	4	.933	10.861	1	.054	16.545	
	71	2	3**	.448	4	.685	3.701	2	.314	5.260	
	73	2	2	.675	4	.588	2.329	3	.322	3.529	
	81	1	3**	.568	4	.880	2.942	2	.077	7.821	
	83	2	2	.861	4	.809	1.305	3	.127	5.014	
	84	2	3**	.931	4	.639	.853	2	.355	2.028	
	88	1	1	.401	4	.772	4.033	2	.135	7.528	
	89	3	2**	.235	4	.519	5.555	3	.423	5.963	
	90	2	2	.224	4	.670	5.679	3	.329	7.099	
	91	1	1	.747	4	.457	1.940	2	.427	2.073	
	92	3	2**	.930	4	.880	.858	3	.069	5.963	

For the original data, squared Mahalanobis distance is based on canonical functions. For the cross-validated data, squared Mahalanobis distance is based on observations.

** Misclassified case

^a Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.

Canonical discriminant functions for grading of expression of osteophyte severity on the superior vertebral surface



Classification Results^{b, c}

		OSGROUP	Predicted Group Membership			Total	
			Minimum expression	Moderate expression	Severe expression		
Original	Count	Minimum expression	13	1	1	15	
		Moderate expression	3	6	4	13	
		Severe expression	0	1	1	2	
	%	Minimum expression	86.7	6.7	6.7	100.0	
		Moderate expression	23.1	46.2	30.8	100.0	
		Severe expression	.0	50.0	50.0	100.0	
	Cross-validated ^a	Count	Minimum expression	13	1	1	15
			Moderate expression	3	6	4	13
			Severe expression	0	2	0	2
%		Minimum expression	86.7	6.7	6.7	100.0	
		Moderate expression	23.1	46.2	30.8	100.0	
		Severe expression	.0	100.0	.0	100.0	

^a Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.

^b 66.7% of original grouped cases correctly classified.

^c 63.3% of cross-validated grouped cases correctly classified.