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Is the Iliac Wing Curved Inward in Patients with Developmental Dysplasia of the Hip?

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Background: There is a paucity of studies on the iliac curvature in developmental dysplasia of the hip (DDH). Here, we examined the iliac curvature in DDH using three-dimensional computed tomography.

Methods: We allocated cases with a center-edge angle of < 20° to the DDH group (55 cases) and cases with a center-edge angle of > 25° to the control group (57 cases) and measured the straight line (line A) between the anterior and posterior superior iliac spines. We examined which part of the iliac bone line A passes through and classified the results into 4 categories (type A, inside the iliac bone; type B, through the iliac bone; type C, outside the iliac bone; and type D, both inside and outside the iliac bone) to evaluate the iliac wing curvature. After measuring the area and internal surface of the iliac wing using line A, we examined the correlation between these values, the interspinous distance, the superior iliac angle, and the center-edge angle.

Results: Distributions of the four types were compared between the two groups; there was no significant difference. The length of the portion of line A inside the ilium and the area formed by line A and the iliac wing, which shows the degree of iliac wing curvature, were not significantly different between the groups. There were no correlations between these values and the center-edge angle; however, there were weak positive correlations among the interspinous distance, the superior iliac angle, and the center-edge angle.

Conclusions: The inward nature of the iliac bone in patients with DDH is mainly due to the internal rotation of the entire iliac bone and less likely due to the curvature of the iliac bone.

Keywords: *Ilium, Developmental dysplasia of the hip, Arthroplasty, X-ray computed tomography*

Various studies have been conducted on the pelvic morphology of patients with developmental dysplasia of the hip (DDH). Kumeda et al.[1] investigated the anterior superior iliac spine (ASIS) distance, anterior open angle of the iliac wing, and intercapital distance using computed tomography (CT) and discovered that the iliac wing rotated inward. In other words, in patients with hip dysplasia, the ASIS distance is short, and the anterior iliac opening angle is large. Aside from these studies, various angles have been measured recently to clarify the pelvic morphology of patients with DDH. Fujii et al.[2] compared the angle of the iliac opening at the level of the ASIS with the angle of the pubic and ischial bones. They reported that the iliac wing was more internally rotated than the sciatic bone. In addition, studies have been conducted on angles related to the pelvis, pelvic incidence, or acetabular angle in comparison with the sacrum, spine, and femoral anteversion.[3-6]

In these studies, a straight line passing through the ASIS and the posterior superior iliac spine (PSIS) or an angle using the straight line, which bypasses the three-dimensional (3D) bone deformity, is often measured. We considered that the iliac wing may be strongly curved inward due to the inward iliac morphology in patients with DDH. If the iliac wings were curved significantly, the distance between the ASIS and the PSIS or the angle formed using the straight line would not reflect the curvature and

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would thus lack accuracy. On the other hand, Dandachli et al.[7] researched methods to estimate the center of the hip joint from anatomical indices in the frontal and lateral views using 3D CT, and Fujii et al.[8] also verified its application in patients with DDH. Although it was possible to make these estimations with an accuracy of approximately 80% and an error of 10 mm using these methods, the estimation accuracy on the X-axis (horizontal line in the coronal axis) is the lowest. As these studies are based on the location of the ASIS, a strongly curved iliac wing may introduce an error due to differences in the location of the ASIS.

However, no detailed studies have compared the iliac wing curvature in adult acetabular dysplasia patients. If patients with DDH have an iliac wing with a larger curvature, the previous studies' measurement approaches, especially using a straight line from the ASIS or PSIS, would not take the iliac curvature into account and the results would be inaccurate. The purpose of this study was to compare the inward curvature of the iliac wing between a DDH group and a control group, reveal the characteristics of the iliac curvature in acetabular dysplasia, and verify the validity of measurements in previous studies.

METHODS

Ethics Approval

This retrospective study was performed in accordance with the ethical standards of the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. The present study was approved by the Institutional Review Board at Oita University (IRB No. 1052; 17 June 2016) and prior to undergoing the CT scan, all study participants provided informed consent to participate in the study and have the results published.

All 3D CT images obtained at the hospital were constructed and measured using the 3D preoperative planning software Zedview (LEXI, Tokyo, Japan). We reviewed 72 hip CT images of 72 female patients with hip arthralgia who were diagnosed with DDH from 2004 to 2019 with radiographic findings of bilateral acetabular dysplasia. CT scans performed for preoperative or close examinations showed that 44 of the patients had undergone acetabular rotary osteotomies. Another 28 scans were obtained during preservation treatment or artificial arthroplasty after preservation treatment. The acetabulum, especially the pubic bone, grows until 25 years of age; therefore, the lower age limit of the recruited patients was 25 years.[9] Upon examination, all patients were in the early disease stage. The acetabulum had a circular head, and the joint space was almost maintained. Seventy-two female patients (72 hips) with idiopathic osteonecrosis of the femoral head were recruited into the control group. Of this number, 29 patients who were transported to our hospital because of trauma did not have lesions on the pelvis, and 43 of the patients did not have pelvic fractures. All patients underwent a CT scan, and their center-edge (CE) angles were measured. After re-examination, we excluded any hip with a CE angle of 20° to 25° from the DDH group and a CE angle of < 25° from the control group. We grouped cases with a CE angle < 20° into the DDH group (55 cases) and cases with a CE angle > 25° into the control group (57 cases). In total, 112 iliac bones of 112 joints were measured and compared. We measured the hip joint in which the osteoarthritis of the acetabulum had not progressed. In cases where both joints exhibited little osteoarthritis, we selected the left hip joint. Similarly, for those with femur crush or degeneration, we selected the contralateral side. The average age was 43.7 years (range, 25–62 years) for patients in the DDH group and 48.3 years (range, 26–65 years) for patients in the control group (Table 1). There were no significant differences in items indicating physique such as height and weight.

First, we measured the length between ASIS and PSIS as a 3D linear distance (line A) (Fig. 1A). We examined which part of the iliac bone line A passes through and classified line A into 4 groups to evaluate the iliac

Table 1. Demographics

Variable	DDH (n = 55)	CR (n = 57)	*p*-value
Age (yr)	43.7 ± 7.67 (25–62)	48.3 ± 11.9 (26–65)	0.01
Height (cm)	156.2 ± 5.43 (143–169)	155.5 ± 6.56 (141–169.5)	0.57
Body weight (kg)	57.4 ± 10.3 (40–82.6)	55.3 ± 10.6 (37.4–82.4)	0.33
Body mass index (kg/m^2)	23.5 ± 3.77 (17.1–32.5)	23.0 ± 4.82 (17.2–35.8)	0.56

Values are presented as mean ± standard deviation (range). A *p*-value obtained by Student *t*-test.
DDH: developmental dysplasia of the hip, CR: control.

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wing curvature. The evaluation plane was created using multiplanar reconstructions. We aligned the pelvic position with the anterior pelvic plane (APP), then the sagittal axis was adjusted perpendicular to line A and the axial plane. Where line A existed was determined based on the evaluation plane (plane X) (Fig. 1B). line A was classified as type A if it first passes inside the iliac bone, type B if it goes through the iliac bone, type C if it passes outside the iliac bone, and type D if it passes both inside and outside the iliac bone (Fig. 2).

Type A, as shown in Fig. 3, has line A passing inside the curvature of the iliac wing to the short inferior part of the iliac bone with almost no curvature. For this reason, it was necessary to compare the curvatures of type A patients. The degree of the curve was evaluated by measuring the length of the portion of line A inside the ilium and the area formed by line A and the iliac wing. The point where line A exits the bone is A, the point where it goes inside the bone again is B, the distance between points A and B is line B (Fig. 4A), and the perpendicular line from the point where the iliac bone is most protruded into plane X (point C) to line B is line C (Fig. 4B). The length of line A depends on the length of the iliac wing, but line B depends on the size of the ilium. Line B/line A was then calculated. For plane X, a case with the area surrounded by the iliac wing and line B has a larger iliac wing, but considering the difficulty in measuring the area, the triangular area formed

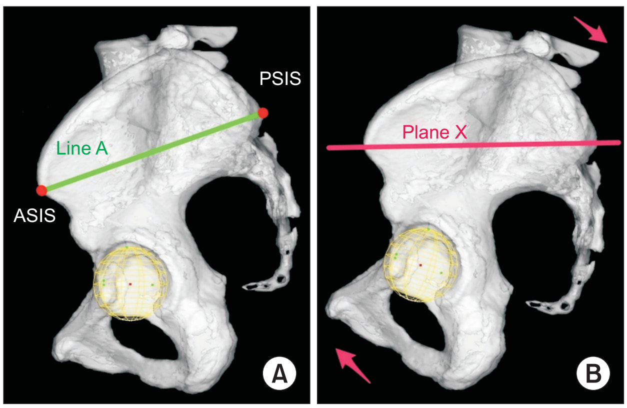

Fig. 1. Measurement method in the sagittal plane. (A) The distance between anterior superior iliac spine (ASIS) and posterior superior iliac spine (PSIS) is measured and named line A. (B) The sagittal axis is adjusted perpendicular to line A, and the axial plane where line A is located is determined as the evaluation plane (plane X).

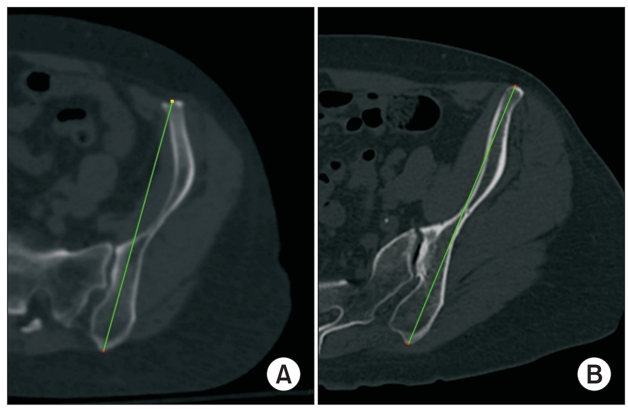

Fig. 3. Position of line A (green line) in type A. Type A includes those with strongly curved inward iliac bones (A) and those with little curved iliac bones (B).

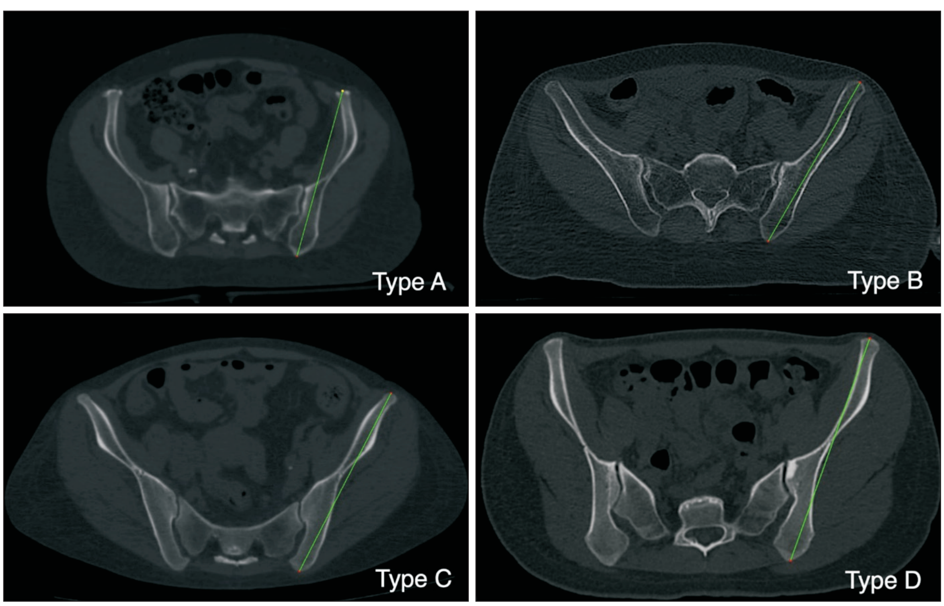

Fig. 2. Variation of iliac curvature. We classified line A (green line) into four groups according to where line A passes. Type A has an inwardly curved shape compared to other types.

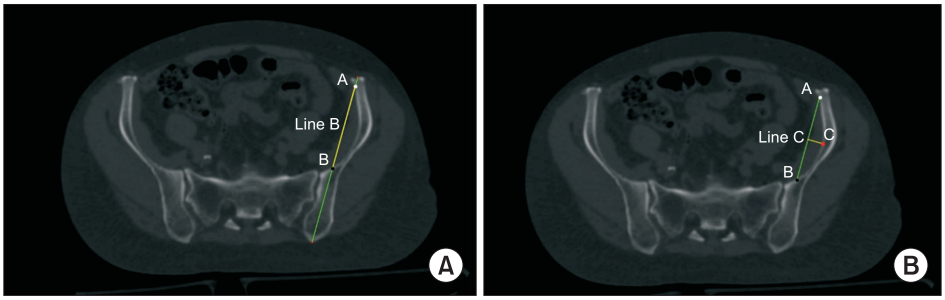

Fig. 4. Measurement method for lines B (A) and C (B). The point where line A exits the bone is A, the point where it goes inside the bone again is B, the point where the iliac bone is most protruded in plane X is C.

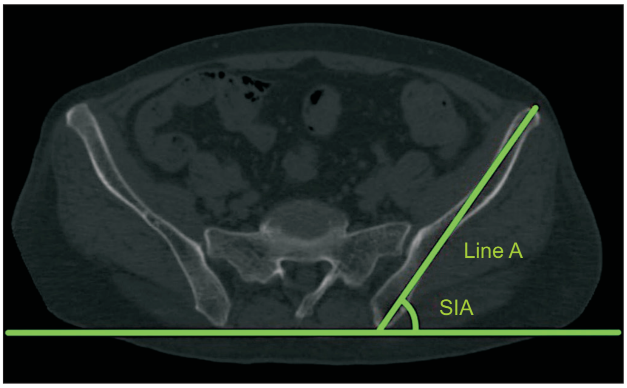

Fig. 5. Measurement of the superior iliac angle (SIA). The SIA is measured as the angle that line A makes with the horizon in the axial plane of the anterior pelvic plane.

by point ABC can simply be calculated using line A, line B, and line C. The values were calculated and compared. In addition, the correlation between the CE angle and line B, line C, line B/line A, and the area of ABC, which together show the degree of the curvature, was examined. To compare whether curvature or iliac rotation affected the coverage, we measured the interspinous distance (ISD) and the superior iliac angle (SIA) and correlated their values with the CE angle. SIA was measured as the angle line A made with the horizon in the axial plane of APP (Fig. 5).

All measurements were performed by one observer (NS) and were repeated with the cases blinded to the observer over the course of two sessions, which were at least 1 month apart. Intraobserver reliability, evaluated using intraclass correlation coefficients (ICC), was excellent (range, 0.96–0.99). The reproducibility of the measurement was tested by two independent observers (NK and HT) who performed measurements for 30 randomly selected hips in a blinded manner. Interobserver reliability, evaluated using the ICC, was also excellent (range, 0.92–0.97). The curvature classification was compared using Fisher's exact test. The values of line A, line B, line C, line B/line A, and area ABC were compared using Student *t*-test. Correlation with CE angle was evaluated using Spearman's rank order correlation coefficient. Comparisons were performed with EZR (Saitama Medical Center, Jichi Medical University, Saitama, Japan), which is a graphical user interface for R ver. 3.6.2 (The R Foundation for Statistical Computing, Vienna, Austria).[10] More precisely, it is a modified version of R commander (ver. 2.6-2) that was designed to include statistical functions frequently used in biostatistics. A $p < 0.01$ was considered statistically significant in all analyses.

RESULTS

Of the 112 cases, 74 were classified as type A (66.1%; DDH group, 40 cases; control group, 34 cases), 11 as type B (9.8%; DDH group, 5 cases; control group, 6 cases), 13 as type C (11.6%; DDH group, 4 cases; control group, 9 cases), and 14 as type D (12.5%; DDH group, 6 cases; control group, 8 cases) (Table 2). Fisher's exact test showed no significant differences between the groups ($p = 0.461$).

Table 2 shows the measured values of line A, line B, and line C: the ratio of line A to line B; and the area ABC in 74 cases of type A (40 cases in the DDH group, 34 cases in the control group). Line A, line B, line C, line B/line A, and area ABC, which indicate the degree of curvature, were not significantly different between the two groups ($p = 0.265$, $p = 0.527$, $p = 0.973$, $p = 0.331$, and $p = 0.845$, respectively) (Table 3). However, the average value was slightly larger in the DDH group. The maximum values for line B, line C, line B/line A, and area ABC were all observed in DDH patients. The ISD was 13 mm shorter and the SIA was 4.2° greater in the DDH group than those in the control group. Both differences were significant. Almost no correlation was observed between line B, line C, line B/line A, area ABC, and CE angle, but weak positive correlations were observed between ISD, SIA, and CE angle (Table 4).

DISCUSSION

In the evaluation of the installation angle of the cup, the APP, which is composed of three points among bilat-

Table 2. Classification of the Iliac Wing in the DDH and Control Groups

Variable	Type A	Type B	Type C	Type D
DDH	40 (35.7)	5 (4.5)	4 (3.6)	6 (5.4)
Control	34 (30.4)	6 (5.4)	9 (8.0)	8 (7.1)
Total	74 (66.1)	11 (9.8)	13 (11.6)	14 (12.5)

Values are presented as number (%). $p = 0.461$ (Fisher's exact test for distribution).
DDH: developmental dysplasia of the hip.

Table 3. Comparison of Type A

Variable	DDH	Control	*p*-value
Line A (mm)	152.17 ± 8.14 (124.63–171.59)	155.13 ± 7.08 (141.77–166.57)	0.265
Line B (mm)	60.22 ± 15.92 (26.97–88.79)	57.79 ± 16.79 (23.03–83.76)	0.527
Line C (mm)	7.04 ± 4.26 (0.87–18.12)	7.01 ± 4.20 (1.01–16.27)	0.973
Line B/Line A	0.40 ± 0.10 (0.18–0.56)	0.37 ± 0.11 (0.15–0.55)	0.330
Area ABC (mm^2)	241.98 ± 191.52 (11.73–51.71)	233.49 ± 179.59 (13.58–681.39)	0.845
ISD (mm)	214.17 ± 20.15 (155.81–265.44)	232.16 ± 18.47 (193.02–271.04)	< 0.001
SIA (°)	66.5 ± 3.62 (56.4–75.7)	62.3 ± 4.86 (51.5–74.4)	< 0.001

Values are presented as mean ± standard deviation (range). A *p*-value obtained by Student *t*-test.
DDH: developmental dysplasia of the hip, ISD: interspinous distance, SIA: superior iliac angle.

Table 4. Correlation with the CE Angle

Variable	Line B	Line C	Line B/Line A	Area ABC	ISD	SIA
Correlation coefficient	–0.039	0.009	–0.077	–0.010	0.362	0.332
p-value	0.738	0.937	0.516	0.935	0.002	0.004

CE: center-edge, ISD: interspinous distance, SIA: superior iliac angle.

eral superior anterior iliac spines and pubic symphysis, is frequently used as the pelvic axis in modern total hip arthroplasty. A detailed examination of iliac morphological abnormalities affecting the location of the ASIS is an essential requirement for determining the true pelvic axis of DDH. Patients with DDH have internal recessed forms, the so-called inward wing. However, if the ilium of DDH actually has an inward wing, it is necessary to clarify whether it is due to abnormal rotation of the entire ilium or anatomical deformation of the ilium itself. Acetabular dysplasia is a major cause of secondary osteoarthritis of the hip and is the leading cause of osteoarthritis in Japan.[11] It is known from previous studies that DDH patients have inward forms of the iliac wing. That is, the iliac bone is internally rotated, and the distance between the ASISs is shortened. However, no study has investigated the curvature of the iliac wing in DDH patients.

In this study, to extract the cases with a strong curvature, they were first classified into 4 groups. Since line A passes inside the iliac wing in cases with a strong curvature, it was classified as type A. There was no significant difference in type distribution between the DDH and control groups. In addition, there was no significant difference in line B, line C, line B/line A, and area ABC values between the DDH group and the control group for estimating the degree of iliac curvature, so the shape of the iliac wing was not significantly different between the DDH and control groups. In other words, we concluded that the curved iliac bone shows individual differences and it is not unique to DDH patients.

However, previous studies on the iliac wing curvature used methods different from the method used in this study because they evaluated the iliac bone superiorly. For a more accurate anatomical evaluation of the curvature, it is desirable to plot and evaluate an actual bone sample superiorly, as in the studies by Wilson et al.[12,13] because it is difficult to evaluate using the CT preoperative planning software. In addition, when the method used in this study is performed again, the values of line C and area ABC in plane X may change depending on the iliac abduction (rise of iliac bone). This measurement error was not verified in this study. However, as mentioned above, many studies using CT have been conducted in recent years; therefore, the classification and measurement methods for CT used in this study are likely to be used in later studies, and they have strong clinical significance.

In this study, the ISD was not much different from those measured in previous papers (Table 5). Although the SIA in our study did not substantively differ from the measurements made by Kumeda et al.,[1] it was slightly larger than the measurements by Fujii et al.[2] and Kobayashi et al.[14] (Table 6). This is probably because the measurement method used in this study was different from that used in previous papers. Kumeda et al.[1] defined the angle between the horizontal line and the line connecting the ASIS and the posterior edge of the sacroiliac joint in the axial plane at the level of the ASIS in the functional pelvic plane. Fujii et al.[2] and Kobayashi et al.[14] defined the angle between the horizontal line and the line connecting the ASIS and the anterior edge of the sacroiliac joint in the axial plane at the superior anterior iliac spine level in the APP. We defined the angle between the line connecting the ASIS and the PSIS to the horizontal in the axial plane in the APP. All these studies have demonstrated the value of the iliac bone rotation. Although the measurement method is different from past research, we determined that the anatomic ridge was a highly reproducible and accurate measurement and thus used this measurement method.

Although there was almost no correlation between the CE angle and the values of line B, line C, line B/line A, and area ABC that can indicate the degree of iliac curvature, a weak positive correlation was found between the ISD, SIA, and CE angle. Thus, it appears that dysplasia is more related to the inward rotation of the whole iliac bone than the curve of iliac bone itself. The present study was able to show the true meaning of inward wing. By clarifying the anatomical features of DDH in detail, it is possible to verify past results accurately and determine the true pelvic axis of DDH in the future.

The limitations of this study are as follows: first, the coverage was only evaluated using the CE angle, and the acetabular sector angle could not be measured.[15] Akiyama et al.,[3] Ito et al.,[16] and Fujii et al.,[2,17] classified patients with acetabular dysplasia into 4 types according to the degree of defect at the acetabular sector angle. It is also necessary to verify the relationship between the 4 types of curvatures and the coverage. Second, cases recruited in this study were only women. It was difficult to recruit the same number of male patients with DDH because most DDH patients are women. Differences in pelvic morphology were not only seen between men and women with healthy pelvises but also in those with dysplastic pelvises,[14] and Wilson et al.[12,13] reported that there is a difference in the iliac wing curvature between men and women. It is, therefore, necessary to conduct similar studies in men in the future.

We compared the iliac shape between DDH and normal patients. There was no significant difference in the iliac curvature between the two groups, and the shape of the iliac bone was determined to be dependent on individual differences. Therefore, the inward form of the iliac bone in acetabular dysplasia is less likely due to the curvature of the iliac bone, but instead to the internal rotation of the entire iliac bone. In addition, since there is no difference in curvature, measuring the distance from the

Table 5. ISD Measurements from Previous Studies

Study	DDH	Control
Kumeda et al.[1]	205 ± 15.5 (178–240)	240 ± 19.0 (211–300)
Fujii et al.[2]	218 ± 17 (183–259)	234 ± 16 (187–274)
Kobayashi et al.[14]	218.5 (189–263)	-
This study	214.17 ± 20.15 (155.81–265.44)	232.16 ± 18.47 (193.02–271.04)

Values are presented as mean ± standard deviation (range) or median (range). The unit of data is millimeter.
ISD: interspinous distance, DDH: developmental dysplasia of the hip.

Table 6. SIA Measurements from Previous Studies

Study	DDH	Control
Kumeda et al.[1]	66.2 ± 6.2 (58–89)	60.8 ± 3.5 (50–67)
Fujii et al.[2]	57.0 ± 6.1	48.4 ± 5.8
Kobayashi et al.[14]	55.7 (43–64)	-
This study	66.5 ± 3.62 (56.4–75.7)	62.3 ± 4.86 (51.5–74.4)

Values are presented as mean ± standard deviation (range), mean ± standard deviation, or median (range). The unit of data is degree (°).
SIA: superior iliac angle, DDH: developmental dysplasia of the hip.

ASIS to the PSIS or the angle using the straight line, which ignores the 3D bone deformity in the measurements performed in previous studies, can be a more reliable method. Our results will help support the reliability of past and future pelvic morphology findings.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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REFERENCES

1. Kumeda H, Funayama K, Miyagishima S, et al. Inward wing ilium of adult hip dysplasia: a characteristic cross sectional pelvic anatomy visualized by CT. Rinsho Seikeigeka. 1986;21(1):67-75.
2. Fujii M, Nakashima Y, Sato T, Akiyama M, Iwamoto Y. Pelvic deformity influences acetabular version and coverage in hip dysplasia. Clin Orthop Relat Res. 2011;469(6):1735-42.
3. Akiyama M, Nakashima Y, Fujii M, et al. Femoral anteversion is correlated with acetabular version and coverage in Asian women with anterior and global deficient subgroups of hip dysplasia: a CT study. Skeletal Radiol. 2012;41(11):1411-8.
4. Anda S, Terjesen T, Kvistad KA, Svenningsen S. Acetabular angles and femoral anteversion in dysplastic hips in adults: CT investigation. J Comput Assist Tomogr. 1991;15(1):115-20.
5. Imai N, Miyasaka D, Tsuchiya K, et al. Evaluation of pelvic morphology in female patients with developmental dysplasia of the hip using three-dimensional computed tomography: a cross-sectional study. J Orthop Sci. 2018;23(5):788-92.
6. Imai N, Suzuki H, Nozaki A, Hirano Y, Endo N. Correlation of tilt of the anterior pelvic plane angle with anatomical pelvic tilt and morphological configuration of the acetabulum in patients with developmental dysplasia of the hip: a cross-sectional study. J Orthop Surg Res. 2019;14(1):323.
7. Dandachli W, Nakhla A, Iranpour F, Kannan V, Cobb JP. Can the acetabular position be derived from a pelvic frame of reference? Clin Orthop Relat Res. 2009;467(4):886-93.
8. Fujii M, Nakamura T, Hara T, Nakashima Y. Can the hip joint center be estimated from pelvic dimensions in dysplastic hips? J Orthop Sci. 2017;22(6):1089-95.
9. Rissech C, Malgosa A. Pubis growth study: applicability in sexual and age diagnostic. Forensic Sci Int. 2007;173(2-3):137-45.
10. Kanda Y. Investigation of the freely available easy-to-use software 'EZR' for medical statistics. Bone Marrow Transplant. 2013;48(3):452-8.
11. Jingushi S, Ohfuji S, Sofue M, et al. Multiinstitutional epidemiological study regarding osteoarthritis of the hip in Japan. J Orthop Sci. 2010;15(5):626-31.
12. Wilson LA, Ives R, Cardoso HF, Humphrey LT. Shape, size, and maturity trajectories of the human ilium. Am J Phys Anthropol. 2015;156(1):19-34.
13. Wilson LA, Ives R, Humphrey LT. Quantification of 3D curvature in the iliac crest: ontogeny and implications for sex determination in juveniles. Am J Phys Anthropol. 2017;162(2):255-66.
14. Kobayashi T, Naito M, Nakamura Y, Ida T, Kuroda D, Nomura T. Sex-related differences in pelvic morphology in acetabular dysplasia. Med Bull Fukuoka Univ. 2015;42(2):241-6.
15. Anda S, Svenningsen S, Dale LG, Benum P. The acetabular sector angle of the adult hip determined by computed tomography. Acta Radiol Diagn (Stockh). 1986;27(4):443-7.
16. Ito H, Matsuno T, Hirayama T, Tanino H, Yamanaka Y, Minami A. Three-dimensional computed tomography analysis of non-osteoarthritic adult acetabular dysplasia. Skeletal Radiol. 2009;38(2):131-9.
17. Fujii M, Nakashima Y, Sato T, Akiyama M, Iwamoto Y. Acetabular tilt correlates with acetabular version and coverage in hip dysplasia. Clin Orthop Relat Res. 2012;470(10):2827-35.