

Anatomical Measurement Study of the Pelvic Bone in Alawasi Ewe Lambs And Local Black She Goats Lambs and its Relationship to the Age of Sexual Puberty

Ahmed A. alhanosh¹, Adnan .A Alhaso²

^{1,2}Department of Anatomy, collage of veterinary medicine, University of mosul

Ahmadanmmar2@gmail.comAdnanhassoali@gmail.com

<https://orcid.org/0000-0001-5790-1035>

Abstract:

By using a pelvic meter machine and rectal probe of veterinary Ultrasound CD66V. the pelvic measurements from the outside of the ewe lambs, it was found that at the time of first sexual puberty, the average distance between the coxal tuber CT was 14.20 ± 0.08 cm, and the average distance between the ischium tuber IT was 9.13 ± 0.11 cm, and the average distance between the coxal and ischium tuber CIT was 17.78 ± 0.21 cm, and the external pelvic measurements of the ewe lambs represented the diameter of the transverse pelvic inlet TPI was 10.00 ± 0.09 cm and the vertical pelvic inlet VPI was 17.03 ± 0.07 cm, It has also been shown that when the first sexual puberty occurs for ewe lambs, the average length of the ovary is 1.66 ± 0.03 cm and the mean width of the ovary is 1.24 ± 0.02 cm, while As external pelvic measurements of local black she goat lambs at first sexual puberty showed, the average distance between the CT is 12.2 ± 0.24 cm, the average distance between the IT 8.02 ± 0.23 cm, the mean distance between CIT was 17.20 ± 0.12 cm, and the average distance between the transverse pelvic inlet TPI was 8.13 ± 0.15 cm and vertical pelvic inlet VPI was 17.00 ± 0.20 cm, It was also found that when the first sexual puberty of the she goat lambs occurred, the average length of the ovaries was 1.53 ± 0.04 cm and the average width of the ovaries was 1.18 ± 0.07 cm.

Key words: pelvic, ewe lamb, she goat lamb, sexual puberty

Introduction

Differences in the shape and size of the pelvic bone in females may lead to dystocia in animals, as many veterinary researchers have pointed out.

Dystocia (difficulty of birth) is a common problem in sheep and causes the death of many lambs. The small pelvis is associated with high cases of dystocia, and high rates of death of female sheep and lambs during childbirth (I.M. van Rooyen, 2012). The mismatch between pelvic size and embryo size leads to an increase in the cost of surgical overlaps and medications and a longer period between births and the risk of fetal and maternal mortality during childbirth (Hafez & Hafez, 2000). A study in Nineveh city confirmed that 5.3% of the causes of dystocia in awassi ewe were due to the small size of the pelvis (Naoman, U. D. et al., 2013). The researchers (Cloete,

S. W. P., &Haughey, K. G. 1988) in their study of 180 Dormer basket sheep and 182 African marino basket sheep aged 2.5 years, stated that the average transvers diameter of the Dormer sheep is 9.96 cm and the average vertical diameter is 11.60 cm. The dissection and pelvic measurement of goat males from barki baskets 8 to 12 months old that the outer distance between the coxal tuber and ischial tuber average of 18.5 cm and an average of 8.8 cm (Seif, M. A et al ,2018) Internal and external measurements of the pelvic bone are important in the field of reproduction and generation, and the anatomical knowledge of the structures of the bone pelvis enables us to avoid many cases of dystocia in animals, because reproduction depends on the pelvis and a good pelvis means a good productive life (F. Coopman and S. de Smet et al .,2003) Trans rectal ultrasound is one of the most important tests aimed at monitoring the growth of ovarian follicles, as well as the development of the fetus in the early period of pregnancy (Bartlewski et al. 2000, Souza et al. 1997) When using the rectal probe of an ultrasound device for ewes and adult female goats, the ovaries appear as an ellipse, with a diameter of 10 x 15 mm, depending on the stage. The determination of the ovarian structures depends on the expertise and experience of technicians. The difference in accuracy between the two examiners may vary by up to 20% (Simoes et al. 2005) After systematically examining 28 heads of female goats by using ultrasound imaging, that the accuracy of the ultrasound examination to determine sexual puberty and ovulation in goats was 100% after a study was conducted, the aim of which was to determine the importance and accuracy of the ultrasound examination. For goats to estimate ovulation and sexual puberty (Grizelj et al , 2013)

The objectives of the research will therefore be to study pelvic bone in local sheep and goats in live animals, through:

Measurements of the outer basin have been taken after certain points have been fixed to it, through which changes in the animal basin are observed by age. Vertical and transverse pelvic in let measurements are taken from the outside and are important in determining the age of sexual puberty of sheep and goats. The use of ultrasound (sonar) to observe ovarian activity, as well as the calculation of the dimensions of the ovaries, which helps us determine the age of sexual puberty of sheep and goats.

Materials and methods:

1- Collection and breeding of animals.

In our study, we used 6 ewe lambs and 6 she goat lambs after recording the birth day for each animal. The animals were numbered with special records for this purpose and were followed up until they reached the age of 90 days (12 weeks) , when we started a study on it. The animals were divided into three groups by age. The group 1 is 90 to 120 days (12 to 16 weeks). Group 2, 120 days to 150 days (16-20 weeks) The group 3 is 150 days old until the appearance of signs of first sexual puberty in the animal (20 weeks - age of sexual puberty)

2-pelvic bone measurements in the animal from the outside:
For this study , use a measuring machine called a pelvic meter to take pelvic measurements,

Figure 1 It is a stainless steel measuring instrument through which the dimensions of the pelvic can be measured, and contains gradients from zero to 50 cm .

measurements were taken weekly of the pelvic bone from out side

The measurements were as follows:

- 1) the measurement between the two coxal tuber (CT) .
- 2) the measurement between the two ischial tuber (IT) .
- 3) the measurement between the coxal tuber and the ischial tuber(CIT) .
- 4) measure the transverse pelvic inlet (TPI) in the middle of the hip bone and the vertical pelvic inlet(VPI) in the base of the bone of the sacrum and the pubic tuber of the tubule

3-Use of the ultrasound sensor:

This is to examine ovaries, examine by rectal probe , review weekly and observe changes on their surface to determine the age of sexual puberty. Ultrasound scans are performed through the rectum, the animal is in standing position and liquid vaseline is placed on the probe to facilitate its entry into the rectum, then rotated 45-90 degrees with a counterclockwise reverse in direct contact with the mucosal membrane of the rectum to determine the location of the right and left ovaries, respectively (Ginther and Kot ,1994). Veterinary Ultrasound CD66V ultrasound V2.2, , which is equipped with a complete electrometric caliper, through which the lengths of most combinations such as ovaries and others can be measured. The sensor was modified by adding a 30 cm rubber tube as (Figure2) or plastic cover around the wire attached to the device at the end of the sensor to increase the ability to control the inside of the rectum (Coubrough, C. A., & Castell, M. C. 1998). Animals checked into a low-light room away from sunshine for clear and perfect images. (Ishwar, A. K. 1995).

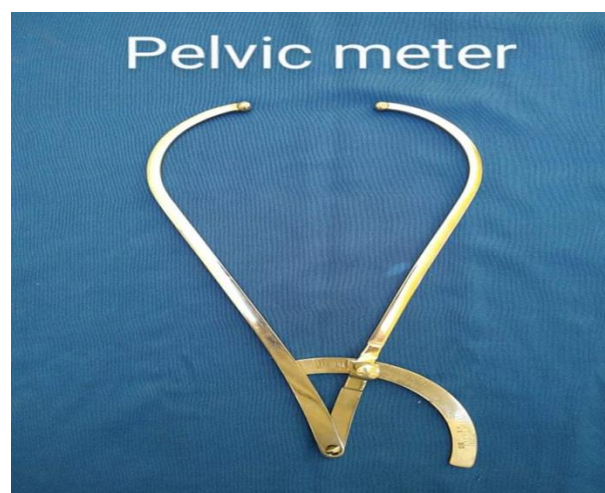


Figure 1 shows pelvic meter machine in study

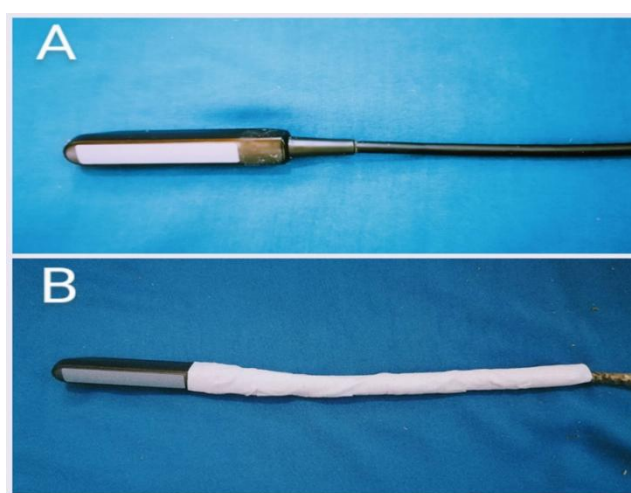


Figure 2 shows A: before adding the rubber tube of the rectal probe, B: after adding

Animals were examined and ovaries were recorded from the age of 90. One day, after unloading the contents of the rectum, the sonar sensor was inserted into the rectum, the urinary bladder was the main structure by which the female's uterus and ovaries could be inferred, and when the

ovary was diagnosed, the best picture was frozen, the ovary surfaces were observed to investigate the presence of the probes, and the ovary dimensions measurements were taken by the electronic scale of the sonar.

4. Statistical analysis: The statistical analysis used to extract the Mean rate and standard error for all measurements by using the SIGMA-STAT ready statistical program

Result:

study of the spatial measurements of the pelvis from outside:

1- Study of Group I measurements of ewe lamb and goat females aged 12-16 weeks.

- a- The results of our study showed that the external pelvic measurements of the ewe lambs and black she goat lambs were the distance between the CT and the distance between IT, as well as the distance between the CIT per week and as shown in table (1)
The lowest distance between the CT in ewe lambs was found in the first week and at 0.07 ± 12.00 cm and the maximum distance was 12.63 ± 0.11 cm in the fourth week. The lowest distance between the IT was 7.00 ± 0.34 in the first week. The maximum distance was 7.33 ± 0.36 cm 7.75 ± 0.17 cm in the third and fourth week, respectively. The lowest distance between the CIT was in the first week and at 14.1 ± 0.31 cm and the maximum distance was at 14.58 ± 0.32 cm, 14.98 ± 0.38 cm in the third and fourth weeks respectively. While the lowest distance between the CT of the she goat lambs was also in the first week and at 8.03 ± 0.14 cm, the maximum distance was at 8.63 ± 0.18 cm in the fourth week, the lowest distance between the IT was at 5.46 ± 0.12 cm in the first week, The maximum distance was 5.68 ± 0.16 cm, 5.86 ± 0.16 cm in the third and fourth week, respectively, while the lowest distance between CIT was in the first week and at 14.46 ± 0.17 cm and the maximum distance was at 14.86 ± 0.21 cm, 15.08 ± 0.25 cm in the third and fourth week, respectively.
- b- the results of the study also showed that the external pelvic measurements of the ewe lambs and black she goat lambs represented the diameter of the transverse pelvic inlet and the vertical pelvic inlet each week. The lowest diameter of VPI in ewe lambs was 14.51 ± 0.13 cm, and the maximum diameter was 15.06 ± 0.08 cm and 15.20 ± 0.10 in the third and fourth week, respectively. The diameter of the TPI in the first week at 7.20 ± 0.05 cm between the third and fourth weeks, the highest at 7.63 ± 0.04 cm and 8.11 ± 0.07 cm respectively. The lowest diameter of the VPI was in she goat lambs 13.56 ± 0.15 cm in the first week and the maximum diameter at 14.01 ± 0.18 cm and 14.18 ± 0.17 cm in the third and fourth week. While the diameter of TPI was the lowest in the first week at 5.75 ± 0.09 cm between the third and fourth weeks was the highest at 5.85 ± 0.09 cm and 6.00 ± 0.10 cm respectively.

2- Study of Group II measurements of ewe lamb and goat females aged 16-20 weeks.

- a- The results of our study showed that the external pelvic measurements of the local ewe lambs and black she goat lambs were the distance between the CT and the distance between IT, as well as the distance between CIT per week and as shown in table 2. The lowest distance between the CT ewe lambs was found in the first week and at 12.71 ± 0.07 cm and the maximum distance was 13.20 ± 0.05 cm in the fourth week. The lowest distance between the IT was 8.01 ± 0.23 in the first week. The maximum distance was 8.48 ± 0.21 cm, 8.72 ± 0.16 cm in the third and fourth week, respectively. The lowest distance between the CIT was in the first week and at 15.21 ± 0.38 cm and the maximum distance was at 15.58 ± 0.38 cm, 15.78 ± 0.39 cm in the third and fourth weeks respectively. While the lowest distance between CT in she goat lambs was also in the first week and at 8.78 ± 0.20 cm, the maximum distance was at 9.00 ± 0.25 cm in the fourth week, the lowest distance between the IT was at 6.00 ± 0.17 cm in the first week, and The maximum distance was 6.18 ± 0.17 cm, 6.21 ± 0.14 cm in the third and fourth week, respectively, while the lowest distance between the CIT was in the first week and at 15.30 ± 0.22 cm and the maximum distance was at 15.55 ± 0.25 cm, 15.66 ± 0.23 cm in the third and fourth week, respectively.
- b- The results of the study also showed the external pelvic measurements of the local ewe lambs and black she goat lambs, which were the TPI and VPI per week, the lowest diameter of the VPI in ewe lambs was 15.43 ± 0.04 cm, and the maximum diameter was 15.75 ± 0.06 cm and 15.86 ± 0.08 in the third and fourth week, respectively. The diameter of the TPI was the lowest in the first week at 8.25 ± 0.05 cm between the third and fourth weeks at 8.56 ± 0.03 cm and 8.68 ± 0.06 cm respectively. The lowest diameter of the VPI was in she goat was 14.46 ± 0.19 cm in the first week, the maximum diameter was 14.81 ± 0.18 cm and 14.91 ± 0.12 cm in the third and fourth week, while the lowest diameter of TPI was in the first week at 6.05 ± 0.12 cm between the third and the fourth weeks at 6.23 ± 0.10 and 6.25 ± 0.12 cm respectively

3-Study of Group III measurements of ewe lamb and goat females 20 weeks old to sexual puberty.

- a- the results of our study showed in taking the external pelvic measurements of the local ewe lambs and black she goat lambs, which were the distance between the CT and the distance between the IT, as well as the distance between the CIT each week, as shown in table 3, as well as table 4.
it was found that the lowest distance between the CT ewe lambs was in the first week and at 13.38 ± 0.04 cm and the maximum distance was 14.20 ± 0.08 cm in the sixth week. (Age of sexual puberty), the lowest distance between IT was 8.77 ± 0.16 cm in the first week, The maximum distance was 9.05 ± 0.10 cm, 9.13 ± 0.11 cm in the fifth and sixth week, respectively. The lowest distance between the CIT was in the first week and at

16.61±0.36 cm and the maximum distance was at 17.26±0.31 cm, 17.78±0.21 cm in the fifth and sixth weeks, respectively. While the lowest distance between the CT of she goat lambs was also in the first week and at 9.18±0.26 cm, the maximum distance was 12.2±0.24 cm in the tenth week (age of sexual puberty), the lowest distance between IT was 6.30±0.15 in the first week. The maximum distance was 7.57±0.21 cm, 8.02±0.23 cm in the ninth and tenth week, respectively. The lowest distance between the CIT was in the first week and at 15.81±0.23 cm and the maximum distance was at 16.93±0.13 cm, 17.20±0.12 cm in the ninth and tenth weeks, respectively.

- b- The results of the study also showed that the external pelvic measurements of the local ewe lambs and black she goat lambs represented the diameter of the VPI and TPI each week. The lowest diameter VPI in ewe lambs was 16.01±0.09 cm, and the maximum diameter was 16.70±0.07 cm and 17.03±0.07 in the fifth and sixth weeks, respectively. The diameter of the TPI was the lowest in the first week at 8.80±0.05 cm between the fifth and sixth weeks at 9.60±0.08 cm and 10.00±0.09 cm respectively. The lowest diameter of the VPI was in she goat 15.03±0.16 cm in the first week and the maximum diameter at 16.52±0.18 cm and 17.00±0.14 cm in the ninth and tenth weeks. The diameter of TPI was the lowest in the first week at 6.33±0.12 cm between the ninth and tenth weeks, the highest at 7.76±0.14 cm and 8.13±0.15 cm respectively.

Measurements of the dimensions (length and width) of the ovary.

See Figure 3, We started recording the dimensions of the ovaries at the very first appearance through our use of the straight sensor of the ultrasound, where weekly measurement was made to the age of sexual puberty, where the ovaries increased in size as the numbers and countries of the exes increased as we approached the first sexual puberty. our study in ewe lambs shown in table (5) showed that the lowest average length and width of the ovary was at the first measurement with an average measurement of 1.20±0.08, 0.80±0.06 cm, respectively, while the maximum measurement was at the age of sexual puberty with an average of 1.66±0.03, 1.24±0.02 cm respectively while in she goat lamb The results of our study shown in table (5) showed that the lowest average length and width of the ovary was at the first measurement with an average measurement of 1.14±0.08, 0.77±0.04 cm, respectively, while the maximum measurement was at the age of sexual puberty with an average of 1.53±0.04, 1.18±0.07 cm, respectively.

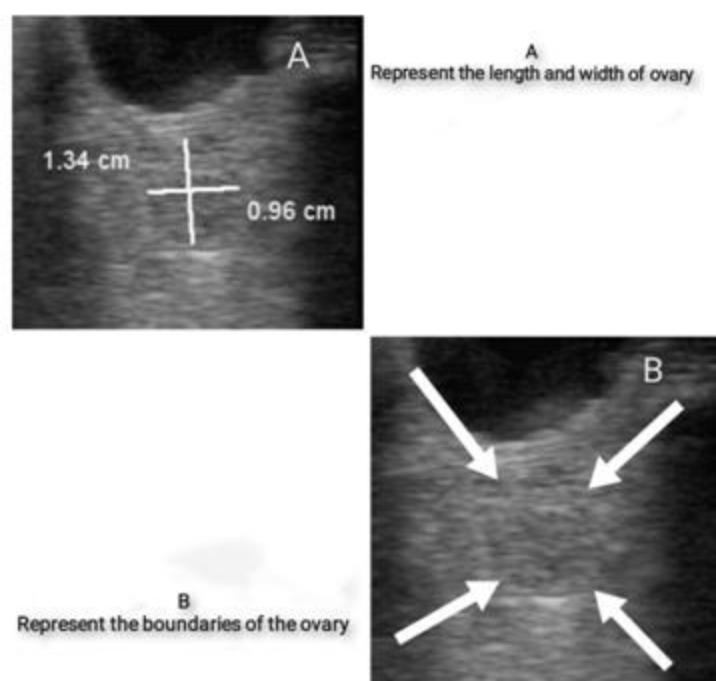


Figure 3

Table (1) Shows the measurements of the pelvic tuber and The TPI and VPI of the ewe lambs and she goat lambs at the age of (12-16 week). Unite cm

Animal measurements per week	Ewe lambs				She goat lambs			
	First week	Second week	Third week	Fourth week	First week	Second week	Third week	Fourth week
CT	12 ±0.07	12.25 ±0.08	12.45 ±0.07	12.63 ±0.11	8.03 ±0.14	8.28 ±0.16	8.51 ±0.16	8.63 ±0.18
IT	7 ±0.34	7.08 ±0.30	7.33 ±0.36	7.75 ±0.17	5.46 ±0.12	5.46 ±0.14	5.68 ±0.30	5.86 ±0.16
CIT	14.11 ±0.31	14.31 ±0.30	14.58 ±0.32	14.98 ±0.38	14.46 ±0.17	14.63 ±0.19	14.86 ±0.21	15.08 ±0.25
TPI	7.2 ±0.05	7.41 ±0.04	7.63 ±0.04	8.11 ±0.07	5.75 ±0.09	5.78 ±0.08	5.85 ±0.09	6 ±0.10
VPI	14.51 ±0.13	14.76 ±0.17	15.06 ±0.08	15.2 ±0.10	13.56 ±0.15	13.58 ±0.16	14.01 ±0.18	14.01 ±0.18

Table (2) Shows the measurements of the pelvic tuber and The TPI and VPI of the ewe lambs and she goat lambs at the age of (16-20 week). Unite cm

Animal measurements per week	Ewe lambs				She goat lambs			
Variable	First week	Second week	Third week	Fourth week	First week	Second week	Third week	Fourth week
CT	12.71 ±0.07	12.83 ±0.05	13.05 ±0.07	13.3 ±0.11	8.78 ±0.20	8.88 ±0.24	8.93 ±0.24	9.0 ±0.25
IT	8.01 ±0.23	8.27 ±0.25	8.48 ±0.21	8.72 ±0.16	6 ±0.17	6.11 ±0.17	6.18 ±0.17	6.21 ±0.14
CIT	15.21 ±0.38	15.36 ±0.40	15.58 ±0.38	15.78 ±0.39	15.3 ±0.26	15.41 ±0.26	15.55 ±0.25	15.66 ±0.23
TPI	8.25 ±0.05	8.45 ±0.05	8.56 ±0.03	8.68 ±0.06	6.05 ±0.12	6.11 ±0.12	6.23 ±0.10	6.25 ±0.12
VPI	15.43 ±0.04	15.60 ±0.03	15.75 ±0.06	15.86 ±0.08	14.46 ±0.19	14.66 ±0.20	14.81 ±0.18	14.91 ±0.18

Table (3) Shows the measurements of the pelvic tuber and The TPI and VPI of the ewe lambs at the age of 20 week to sexual puberty age . Unite cm

Animal measurements per week	Ewe lambs						
	Variable	First week	Second week	Third week	Fourth week	fifth week	sixed week
CT		13.38	13.51	13.63	13.78	14	14.2
		±0.04	±0.08	±0.04	±0.10	±0.07	±0.08
IT		8.77	8.87	8.89	8.9	9.05	9.13

	± 0.16	± 0.12	± 0.10	± 0.07	± 0.10	± 0.11
CIT	16.16	16.23	16.55	16.93	17.26	17.78
	± 0.36	± 0.35	± 0.35	± 0.36	± 0.31	± 0.21
TPI	8.8	8.94	9.13	9.4	9.6	10
	± 0.05	± 0.05	± 0.06	± 0.03	± 0.08	± 0.09
VPI	16.01	16.10	16.31	16.48	16.7	17.03
	± 0.09	± 0.08	± 0.07	± 0.04	± 0.10	± 0.20

Table (4) Shows the measurements of the pelvic tuber and The TPI and VPI of the she goat lambs at the age of 20 week to sexual puberty age . Unite cm

Animal	She goat lambs									
Variable	First week	Second week	Third week	Fourth week	fifth week	Sixth week	Seventh week	eighth week	Ninth week	tenth week
CT	9.18	9.51	9.78	9.98	10.26	10.5	10.98	11.25	11.83	12.2
	± 0.26	± 0.25	± 0.26	± 0.26	± 0.25	± 0.26	± 0.23	± 0.22	± 0.22	± 0.24
IT	6.3	6.4	6.55	8.65	6.87	6.99	7.19	7.28	7.57	8.01
	± 0.15	± 0.16	± 0.14	± 0.15	± 0.15	± 0.16	± 0.13	± 0.19	± 0.21	± 0.23
CIT	15.81	15.9	16.1	16.23	16.43	16.6	16.63	16.78	16.93	17.2
	± 0.23	± 0.21	± 0.19	± 0.19	± 0.20	± 0.20	± 0.20	± 0.15	± 0.13	± 0.12
TPI	6.33	6.46	6.61	6.75	6.96	7.06	7.18	7.45	7.76	8.13
	± 0.12	± 0.09	± 0.12	± 0.11	± 0.13	± 0.12	± 0.14	± 0.15	± 0.14	± 0.15
VPI	15.03	15.13	15.16	15.4	15.66	15.75	15.93	16.17	16.52	17
	± 0.16	± 0.15	± 0.16	± 0.15	± 0.14	± 0.15	± 0.14	± 0.16	± 0.17	± 0.14

Table (5) dimensions of ovaries from the first sonar appearance to the age of sexual puberty inewe lambs and she goat lambs. Unite cm

Animal	ewe lambs		She goat lambs	
Variable	L	W	L	W
First Measure	1.20	0.80	1.14	0.77
	± 0.08	± 0.06	± 0.08	± 0.04

second Measure	1.24 ±0.03	0.84 ±0.03	1.18 ±0.06	0.79 ±0.03
Third Measure	1.28 ±0.02	0.90 ±0.02	1.22 ±0.05	0.83 ±0.03
Fourth Measure	1.32 ±0.04	0.94 ±0.04	1.25 ±0.06	0.86 ±0.04
Fifth Measure	1.37 ±0.03	1.01 ±0.03	1.29 ±0.04	0.93 ±0.05
Sixth Measure	1.42 ±0.02	1.10 ±0.03	1.35 ±0.05	0.97 ±0.02
Seventh Measure	1.50 ±0.02	1.19 ±0.02	1.43 ±0.03	1.06 ±0.06
Eighth Measure	1.66 ±0.03	1.24 ±0.02	1.47 ±0.07	1.11 ±0.08
Ninth Measure			1.53 ±0.04	1.18 ±0.07

L: length of the ovary , w: width of the ovary, Eighth Measure in ewe lambs Represents age of sexual puberty , Ninth Measure in she goat lambs Represents age of sexual puberty

Discussion:

The researcher (Aziz.D.M , 1995) recalled that the distance between the CT of a common birth was 18.25 ± 0.46 cm. In cases of dystocia due to the asymmetry between pelvic distance, fetal size and other causes of dystocia, the distance was 17.57 ± 0.57 cm. The CIT same side was 23.62 ± 0.74 cm at birth. In cases of dystocia it was 22.38 ± 1.71 cm, while the results of our study of ewe lambs at the age of first sexual puberty were 14.20 ± 0.08 cm at the CT and 17.78 cm at the CIT ,the reason why our results didn't match with the researcher was because the researcher's study involved adult sheep who had dystocia, while our study results were for sheep's first puberty 27 weeks. The researchers (Cloete, S. W. P. and Scholtz et al., 1998) reported in their study of 180 heads of Dormer sheep and 182 heads of African Merino sheep of 2.5 years of age, that the TPI of Dormer sheep breed is 9.96 cm, while the TPI in African merino 9.78 cm, These results do not completely match the results of our study, as the average transverse pelvic inlet TPI of ewe lambs to the last measurement (age of sexual maturity) is 10.00 ± 0.09 cm. The reason for this difference in measurement is the difference in the breed of sheep. It is known that the Awassi sheep breed is huge compared with other breeds. The method of taking the measurement for the distance of the transverse pelvic inlet, which the researchers used above, is different from the measurement methods in our study. The researchers (5) also indicated in their study of dissection and pelvic measurement of goat males from barki baskets 8 to 12 months old that the CIT was an average of 18.5 cm. The average of TPI was 8.8 cm, while the results of our study were close to those of the researchers, where the average CIT of the she goat lambs was at the age of first sexual puberty (31 weeks) is 17.20 ± 0.12 cm. The average TPI is 8.13 ± 0.15 cm, The reason for the convergence in the results is due to the approximate ages of the animals used in both studies, Parkargoat considered to have size similar to the local goat used in our research.

Conclusion

he size of the pelvis increases the closer the age of sexual puberty in the ewe lambs sheep and the black she goat, and the larger the size of the ovaries, the closer the age of the first sexual puberty, because Follicle growth of ovaries, giving the ovaries a larger diameter.

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Conflict of interest

The authors declare that conflict of interest exists

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