MATERIALS AND METHODS: Nine specimens of larynx of apparently healthy RSG were obtained from Sokoto Modern abattoir. The skin and superficial fascia on the ventral midline of the neck were excised to expose the laryngeal muscles as earlier described by Igbokwe and Ezeasor (2015). The color, shape and position of the laryngeal cartilages were noted. The larynx was severed just around the pharynx and the joint with hyoid bone. The caudal aspect was also severed from the traheostomy. The individual cartilage was separated with the aid of Antanatomical atlas for diagnoses. Hence there is a need for extensive study of this important organ to understand its anatomy to provide the basis for the diagnosis of its diseases, which is scanty in scientific literature.

INTRODUCTION: In Nigeria, goat is kept by many rural dwellers in small herds to serve as sources of financial stability and supply of meat and milk products (Byanet et al., 2014), thus Red Sokoto Goat (RSG) is the predominant and most important breed of goat in Nigeria. The RSG is the predominant and most important breed of goat found mainly in the Sudan and Sahel savanna zone in the Northwestern zone of Nigeria. This breed is well adapted to the arid zones and its population has been estimated to be 17.3 million, which accounts for about 70% of the 34.50 million goats in Nigeria (Byanet et al., 2014). The larynx is a cartilaginous structure that forms the link between the pharynx and the tracheobronchial tree (Dyce et al., 2010). It lies caudal the pharynx and behind the trachea. The lumen being pseudo-stratified columnar ciliated epithelium. The larynx is a firm irregular tubular structure situated in between the ramii of the mandible with the laryngeal muscles are intertwined in between the cartilages. The rostral aspect of the larynx forms the caudal border of the pharynx while the caudal end of the larynx continues as the trachea. The thyroid cartilage is the largest while the arytenoids are the smallest. Histologically, the thyroid, arytenoids and cricoid are of the hyaline cartilage while the epiglottis is made up of the elastic cartilage. The research work focus on evaluating the gross and microscopic anatomy of the larynx, thus, providing information for future use in both anatomical studies and clinical applications.

Keywords: Larynx, cartilage, hyaline, elastic, epiglottis, cricoid, arytenoid.
microscope to evaluate the histology of the samples.

RESULTS AND DISCUSSION: The larynx is a firm irregular tubular structure situated in between the ramii of the mandible. It is suspended by the hyoid bone, ligaments, and muscles. Laryngeal muscles are intertwined in between the cartilages. The rostral aspect of the larynx forms the caudal border of the pharynx while the caudal end of the larynx continues as the trachea. The larynx was found to be made up of a paired arytenoid cartilage and three unpaired cartilages: thyroid, epiglottis and cricoid. Morphologically, the arytenoid is paired cartilages that articulate cranially with the epiglottis, proximally with the thyroid cartilage and caudally with the cricoids cartilage. They have an irregular shape which resembles a pyramid with apex and a base. They are the smallest of the four cartilages (figure 1).

Table 1: The morphometry of laryngeal cartilages.

<table>
<thead>
<tr>
<th></th>
<th>Thyroid</th>
<th>Epiglottis</th>
<th>Arytenoids</th>
<th>Cricoids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (g)</td>
<td>1.31 ± 0.49</td>
<td>2.06 ± 0.85</td>
<td>1.53 ± 0.04</td>
<td>2.06 ± 0.85</td>
</tr>
<tr>
<td>Length (cm)</td>
<td>2.97 ± 0.36</td>
<td>2.40 ± 0.58</td>
<td>1.48 ± 0.03</td>
<td>1.94 ± 0.43</td>
</tr>
<tr>
<td>Bread (cm)</td>
<td>2.44 ± 0.57</td>
<td>1.61 ± 0.60</td>
<td>0.99 ± 0.09</td>
<td>1.22 ± 0.36</td>
</tr>
<tr>
<td>Length from thyroid notch to posterior margin (cm)</td>
<td>1.87 ± 0.19</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cranial cornua (cm) 0.62 ± 0.31
Caudal cornua (cm) 1.14 ± 0.25
Width of dorsal lamina (cm) 1.94 ± 0.11
Transverse diameter (cm) 1.94 ± 0.43

Figure 1: Cranial view of arytenoid cartilages (a), dorsal view of cricoid cartilage (b), cranial view of the Epiglottis cartilage (c) and caudal view of cricoid cartilage of red Sokoto goat.

Thyroid cartilage is a semi-circular structure covering the ventral aspect of the laryngeal boundary. It’s the largest among the laryngeal cartilages. Cranially, it attaches with the proximal part of the epiglottis. It has cranial cornua which attaches with the hyoid bone and caudal cornua attaches with the prominence of the cricoids cartilage (figure 1). However, Epiglottis forms the most cranial aspect of the larynx and extends into the pharynx. Its cranial border has a proximal and distal two-pointed leaf- like lips with the proximal lip being the largest. The caudal end of the epiglottis joins with the arytenoids distally and proximally with the thyroid cartilage. The epiglottis is flexible and relatively softer than the other laryngeal cartilages (figure 1). Cricoids cartilage appears ring shaped cartilage that forms the caudal extremity of the larynx. Caudal to it, continues the first tracheal ring. It has a broad proximal lamina. The arytenoids attach to its cranial lower part. The transverse diameter of the ring is longer than the width across the ring in all the samples dissected (figure 1). The average weight of thyroid cartilage in Red Sokoto goat was found to be 1.31 ± 0.49 grams. The length was 2.97 ± 0.36 cm, the maximum thyroid width was found to be 2.44 ± 0.57 cm, the length from thyroid notch to posterior margin was 1.87 ± 0.19 cm, the lengths of cranial and caudal cornua were found to be 0.62 ± 0.31 cm and 1.14 ± 0.25 cm as shown in table 1. The epiglottis weighed 2.06 ± 0.85 grams; however, the average length and width were 2.40 ± 0.58 cm and 1.61 ± 0.60 cm respectively (table 1). The arytenoids weighed 0.39 ± 0.20 grams, average length of 1.48 ± 0.31 cm with a base width of 0.99 ± 0.09 cm (table 1). The cricoids cartilage weighed 1.53 ± 0.64 grams and transverse diameter measures 1.94 ± 0.43 cm, the maximum width has a measurement of 1.22 ± 0.36 cm while the width of dorsal lamina measures 1.94 ± 0.11 cm (table 1). The thyroid, arytenoid and cricoids cartilages all possess hyaline cartilage characteristics. The perichondrium envelopes the cartilage and within the matrix are sparsely lies multiple lacunae that houses chondrocytes. The matrix in thyroid cartilage is densely populated with lacunae while that of cricoid and arytenoids are sparsely populated (figure 2-5). Epiglottis is made up of elastic cartilage with a matrix surrounded by perichondrium. The matrix is heavily infiltrated with elastic fiber and the lacunae are surrounded by dense elastic fibers. The chondrocytes are each placed within a lacuna (figure 1).
CONCLUSION: This research work focus on evaluating the gross and microscopic anatomy of the larynx, thus, providing information for future use in both anatomical studies and clinical applications.

CONFLICT OF INTEREST: The authors declare no conflict of interest.

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