Photometrical and Anatomical Study of Teeth of Sailfin Molly Fish *Poecilia latipinna*

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Abstract

The present study aimed to determine the location of the teeth in the Sailfin molly fish *Poecilia latipinna* and the dentition pattern, In addition to studying the structure of teeth, both morphological and anatomical. Bringing a number of Sailfin molly fish, They were dissected in the laboratory and Samples were prepared using the Whole mount method, and Some were prepared for imaging by a scanning electron microscope (SEM).

The results showed that the teeth are located in two regions in *p. latipinna* are both mouth and pharynx, the dentition pattern between the two regions is dissimilar of shape, size and distribution of teeth. The teeth are organized in the mouth region in two rows, a row of outer teeth (OT) and a row of inner teeth (IT) on both upper and lower jaws, The Outer teeth were larger than the inner teeth, in addition to their differences in shape, The outer tooth was similar to the Sickle, while the inner tooth was cobra-like. In the pharynx, the dentition pattern differed from that of the mouth, The teeth were distributed in two regions in each part of the jaw, it is a Arrangement Teeth Region (ATR) and another Less Arrangement Teeth Region (LATR), The teeth in these regions were arranged in the form of primary and secondary rows, the order of these rows and their poles varied between the upper and lower pharynx jaws.

Keyword: Teeth, distribution, Photometry and Anatomy*, Poecilia latipinna*

Introduction

Teeth is a solid bone structure in the oral cavity, a typical organ with a good phenotypic pattern to understand the complexities of different biological levels associated with vertebrate diversity, The various biological disciplines that range from ecology to genomics are intertwined (Hulsey *et al*., 2016), the teeth are modfied on different faces to do food gnawing, shredding or cutting and grinding before swallowing (Tucker and Sharpe, 2004).

The teeth are the only evidence of the existence of the old animal due to its durability and resistance to degradation, and to the diversity of its morphological and structural characteristics, It has provided a lot of information that shows the paths it has gone through during the time periods to reveal the identity (Moeller, 2003; Dieleman *et al*., 2015), and gave information on animal behavior and nutritional habits (Tucker and Sharpe, 2004), it was a system for understanding genetic interactions (Jernvall and Thesleff, 2012; Jackman *et al*. 2013), Where the teeth in both human and fish are identical homologous, the mineralization occurs in them from similar substances that existed in their first vertebrate ancestors (Fraser and Smith, 2011; Rasch *et al*. 2016).

The pattern and shape of teeth are closely related to dietary habits, the crown of teeth is often used as a sign of environmental adaptation, Thus the diversity of teeth reliably reflects changes in the life history of species (Mihlbachler *et al*., 2011), consequently, teeth are highly beneficial in environmental adaptation because they are linked to the diet, Especially in fish Actinopterygians that probably have a study of behavior, and very high diversity in the teeth (Pasco-Viel *et al*., 2014).

Teeth in most teleosts are polygryodont (Tome, 2017), and they are acrodont as they are attached to the upper surface of the jawbone (Christian *et al*., 2010), fish teeth are usually homodont, they are identical in shape and function (Ohazama *et al*., 2010).

The fish differed in terms of location of the teeth and their presence in the fish, confined to mouth jaws in sharks (Streelman *et al*., 2010), and on the palatine and vomer bone in fish *Katsuwonus vagans* and *Euthynnus yaito* (Isokawa, 1955), While found in jaws of mouth and pharynx in fish Oryzias latipes (Debiais-Thibaud *et al*., 2007) and Cichlidae, Its presence was confined to the ceratobranchial in the pharynx of the Zebrafish fish (Fraser *et al*., 2009), In most teleosts teeth are found in the roof and bottom of the pharynx as fish *Lepomis microlophus* (French III, 1993; Vandewalle *et al*., 2000).

Dentition was studied in different fish and it was noted that there was a great diversity in the shape of the teeth, their numbers and the pattern of their arrangement (Hassan, 2013), Some species of the Cichlidea family such as *Cynotilapia afra* which live in rocks have a few conical teeth, spaced and arranged in a 2-3 row, While the fish that feed on the algae of the genus Petrotilapia possessed tricuspid teeth that arranged in a 10-15 row (Fraser et al., 2008). In addition to the difference between genus and other, Species within the same genus differed among themselves in the form and type of teeth as in salmon fish species (Constantinescu *et al*., 2015), In the genus Poecilia Lewis et al. (1999) found significant differences in the number of inner teeth on the mandible between the three species *Poecilia Formosa*, *P. latipinn* and *P. mexicana limantouri*, explained in his study that the species P. Formosa represents an independent species and the two species are not a predecessor.

Studies on the subject of dentition in the poeciliidae family are almost limited, the studies that studied the teeth in Poecilia were confined to morphological of teeth in general. Many studies on this species have been about reproductive and genetic characteristics such as *Poecilia Formosa*, *P. mexicana* and *P. latipinna* (Lewis *et al*., 1999).

Due to the large diversity of fish species belonging to same the family and the same genus, and because the studies related to dentition in the family of poeciliidae was limited, and focused on the dentition in a specific region of fish, The current study aimed at take the subject of dentition in one of the family of Molly, Sailfin molly fish *P. latipinna*, to give detailed information, broader and most comprehensive about the dentition in this species.

Materials and Methods

P. latipinna fish were brought from decorative fish shops and transported to the laboratory and placed in 200-liter glass basins with air pumps and hydrates to maintain the water temperature of 28-25 C, salinity 0.7 ppt, medium light and Ph = 7.5 and left for two weeks to adapt. The average length of the fish was 5 centimeters at a difference of ± 1 and the mean weight 5 ± 2. After that, some fish were dissected and both the oral and pharyngeal regions were examined in a fresh state to record the required information. Some samples were fixed with 30% formalin for the purpose of staining Whole Mount method, others were dissected for the purpose of eradicating dental-bearing structures in the oral and pharyngeal regions and were fixed with formalin 10% concentration for the preparation of SEM.

Samples fixed with formalin Concentration of 30% passed through the Whole Mount procedure using the red alizarin stain of the bone and alcian blue stain of the cartilage according to Simons and Van Horn (1971) method, The shape of the tooth-bearing structures in the samples dyed is more pronounced and the tooth parts can be distinguished, making the examination and imaging easier, while the samples that were fixed with the formalin concentration of 10% were washed with water to rid of excess formalin and were saved with by alcohol concentration of 70% (Kearnan, 2012) for SEM - type S50.

Some teeth were removed from their bearing structures in the oral and pharyngeal region in both fresh and dyed specimens, to conduct an accurate and detailed examination of the shape and parts of the tooth, the size of the teeth and their bearing structures were measured in the whole mount under the Leica DM500 optical microscope, and the Zeiss Primo Star imaging microscope with Canon PC-1564, Japan, as well as the Wild Heerbbrugg-MDG 17 anatomical microscope.

It was based on the ocular in the measurement of teeth under calibration microscope, the length of the tooth was measured from its contact point with the bony base TB until its apical end. The number of teeth was calculated for whole mount samples, the specimens that teeth appear to have completed rows have been adopte, the calculation was done manually and directly under the anatomical microscope and the rate was extracted from five samples of the replicates studied, The fresh samples were examined and photographed after washing with the physiological solution 0.6% concentration, then dried a little and submerged with oil Immersion, While Whole Mount samples were photographed after being placed in a glass dish and submerged in pure glycerin. The teeth, their parts and the bearing structures were described in their areas of presence in the fish and studied the pattern of the arrangement of teeth, in addition to the calculation of the numbers of teeth on these structures.

Results

The results of the morphological and anatomical study of P. latipinna fish showed that they had two types of teeth, Oral Jaws Teeth (OJT) which erupt in the oral cavity and Pharyngeal Jaws Teeth (PJT) in the pharyngeal cavity (Figs. 1 and 2).

1- **Oral Jaws Teeth**

The results indicate that teeth in mouth are arranged on mandibular arch structures that consisting of two parts, upper part is Maxillary (Max) and bottom part is Mandible (Man). Each jaw is composed of two halves symmetrical, right and left connected to each other in middle line of fish (Figure 1, 2, 3 and 4).

The results of the microscopic examination of alizarin stained samples (Fig. 3) and SEM samples (Fig. 4 and 5) show that the teeth in oral region are arranged in two rows. first row teeth are located outward called Outer Teeth (OT), while second row teeth are small and located at interior after the outer teeth called Inner Teeth (IT). Outer teeth include only one row, and their distribution is determined at the wide outer edge of jaw bones which is represented by premaxillary in upper jaw and dentary in bottom jaw. Inside of outer teeth there is a row or several rows of irregular internal teeth that continue on lateral dorsal edge of the upper jaw (Fig. 3, 4, 5, 6, 7, 8 and 9).

Size of outer teeth larger than inner teeth (Fig. 5, 6, 10 and 11), average length of outer tooth amount to 500 microns and width is 50 microns, while average length of inner tooth is 100 microns and width 20 microns. The average number of outer teeth In fish completed of rows amount to 60 in upper jaw and 70 in the lower jaw were evenly distributed on right and left parts of each jaw.

The general tooth shape of both outer and inner teeth appears cylindrical, based on bony base is Tooth Base (TB). The tooth is consist of two parts, a large hollow part that represents Tooth Shaft (TSH), which is connected to tooth base and its cavity is continuous with the base cavity (Fig. 10, 11, 12, 13 and 14), and other side is connected with second part, which is smaller - about a quarter of tooth - that represents the Peakal Part (PP) of the tooth, which also seems hollow except for its terminal end, contact outlines between tooth parts are clear, similar to suture (Fig. 10, 11, 12, 13, and 14), and there was a clear correlation between inner and outer teeth bases in mouth (Fig. 10 and 11).

Outer tooth differs from inner tooth in shape as well as the size, outer tooth is flattens of front and back side from last third of tooth shaft to its peakal end, its terminal end appears to more flat than rest of the parts (Fig. 5, 10, 15, 16 and 17), while inner tooth flattens of front and back side from last quadrant - peakal part - and then gradually taper towards the terminal end of tooth that appears pointed (Fig. 12, 14, 18 and 19).

outer and inner teeth are recurved, curved toward the oral cavity, and outer tooth curvature is larger than inner tooth (Fig. 5, 6, 10, 13 and 15). Outer tooth from Its lateral side appears Sickle-like (Fig. 10 and 13). The curvature of inner tooth is confined to its peakal end,which characterized by it contain Crest (Cr) along its concave surface - towards oral cavity - this gives it a cobra-like shape (Fig. 12, 14, 18 and 19).

Oral jaw teeth in fresh state appear translucent, except for peakal part that appears to be brown (Fig. 13 and 14). Shaft tooth pigmentation with alizarin red stain, but peakal part do not pigmentation and it is keep on its natural color in soft state. Tooth base and bearing structure bone are strongly colored with this stain and appear red color (Fig. 10, 11, 12 and 17).

2- **Pharyngeal Jaw Teeth**

The pharyngeal teeth are located in the pharyngeal region of both the roof and bottom, and are carried on upper pharyngeal jaw (UPJ) and bottom pharyngeal jaw (BPJ) structures (Figs. 1 and 2), upper and lower pharyngeal are indirectly linked to each other (Figs. 20 and 21)**.**

The upper pharyngeal jaw is oval almost in its surface opposite to pharyngeal cavity (Fig. 1 and 22), it is consist from two right and left parts, each of which is also oval called Pharangiobranchial (PHB) (Figs. 22 and 23). The average length of jaw is 4 mm and its wide region is 4 mm, this jaw appears of convex in roof of pharyngeal cavity (Fig. 1 and 22).

Pharyngeal teeth in bottom it bears on structure triangle of shape a representing bottom pharyngeal jaw. The average length of the jaw is 5 mm and average width at Its broad base is 5 mm wide. It consists of two parts, right and left part, both of them similar to fly wing called Ceratobranchial (CEB). These two parts are connected together to form a simple concave that runs along the middle line of bottom jaw, this concave at the bottom corresponds to the convex at the roof of pharyngeal cavity (Fig. 2, 24 and 25).

The upper pharyngeal jaw connectes with the four bronchial arches by Bony extension (BEX) (Fig. 21), while the bottom pharyngeal jaw be contact with the braces is more stronger than his counterpart at upper, it is connected directly to the fourth arch, which in turn communicates with the other three archs through bony structures are Ebibranchial, Hypobranchial, Basibranchial (EHB) (Fig. 20 and 21).

The upper pharyngeal jaw teeth are regulaed in a special pattern that distinguishes it into two regions: Arrangement Teeth Region (ATR) and Less Arrangement Teeth Region (LATR), ATR occupies two thirds of the jaw and It is located on the side connected to the digestive tract while LATR is located towards the oral cavity (Figs. 22 and 23).

ATR of the upper pharyngeal jaw contains a number of primary Rows (PrR) ranging from 4 to 5 rows per part, its longitudinal axis parallel to the longitudinal axis of the jaw, Its longitudinal axis parallel to the longitudinal axis of the jaw, each row consists of secondary Rows (SeR) ranging from 10-13 (Fig. 22, 23, 26 and 27), each secondary row appears as a comb-like (Fig. 26, 27, 28, 29 and 30), secondary rows contains a number of teeth ranging from 3 to 15 according to the location, number of teeth in the secondary rows near the edge of bearing structure is less compared with middle rows, it was also observed that secondary rows were reciprocal between neighboring primary rows (Figs. 23, 26, 27 and 29). The teeth arrangement becomes less apparent in the LATR than it is in the ATR gradually, number of primary rows increased and size of teeth decreased compared to ATR teeth towards the far edge of the near front part of oral cavity, the number of primary rows ranges from 7-8, each containing 5-8 from secondary rows of teeth (Fig. 22, 23 and 31).

The bottom pharyngeal jaw is characterized into two region, Arrangement Teeth Region (ATR) and Less Arrangement Teeth Region (LATR), opposite to their counterparts at upper pharyngeal jaw (Figs. 24 and 25). The bottom pharyngeal jaw teeth are regulaed in the form of arched primary rows, from 6 to 9 rows, their longitudinal axis perpendicular to the longitudinal axis of the jaw, each primary row in the right part opposited to another row in the left part and at the order level same (Fig. 24, 25 and 32). It was observed that the first primary row at base the triangle structure of the - beginning of ATR - is shorter than the rows that followed, the longest of which is the rows located at middle of ATR , and rows are gradually reduce with beginning of the LATR (Fig. 24, 25 and 32), the primary row consists from12-24 of secondary rows that are arranged with an almost oblique angle on longitudinal axis of the primary row in ATR (Figs. 24, 25 and 32). Secondary grade teeth are characterized by combacted together and vary in number between 2 and 6 of teeth in one row (Fig. 32, 33 and 34). It is also observed that this arrangement of rows and teeth in ATR gradually disappears, the number of teeth decreases and the size of teeth smaller towards LATR, especially near the tapered end of the bottom jaw representing the end of LATR, secondary rows are missing and primary row becomes a single (Fig. 24, 25, 32, 34 and 35).

The size of pharyngeal teeth in upper jaw amount to their average highest on proximal margin of ATR, length average of teeth is 400 microns and their width is 50 microns. teeth size reduced of until it amount to the half at the far edge (Fig. 30). Teeth of LATR are smaller in comparison to ATR. The average length is 100-300 microns and their width 20-40 microns. The average size of teeth in bottom pharyngeal jaw at both the proximal and distant edges of ATR was similar to their counterparts at the roof, as well was LATR (Fig. 36).

The general shape of pharyngeal teeth in upper and bottom jaws at the roof and bottom is similar to oral jaws teeth. It is consist up of cylindrical shaft and flat peakal part, with a pointed end, and that based on a bony structure is tooth base (Fig. 28, 37, 38, 39, 40, 41, 42 and 43). The tooth base appears cylindrical from distant end associated with tooth. The contact region appears clear joint-like, and the base appears hollow, and its cavity continuous with shaft cavity (Fig. 28, 37, 38, 40, 42 and 44).

The ventral side of peakal part of pharyngeal teeth at upper and bottom jaws contains a crest similar to that found in inner teeth of mouth. The peakal part of upper pharyngeal jaw teeth is characterized it is similar a spear (Fig. 45, 46 and 47), Its curvature are simple (Figs. 37 and 48), while the peaka part of bottom pharyngeal teeth appears to larger than upper jaw teeth and is more curvature and less flat (Fig. 40, 41, 49, 50 and 51). The pharyngeal teeth on upper and bottom jaws based on their bases through slanted angle, teeth bend in upper jaw towards back, away from the oral cavity (Figs. 23 and 27), the pharyngeal teeth at bottom jaw is bend towards the oral cavity, reverse of their bend in the roof (Figs. 32 and 33). The peakal part of pharyngeal teeth at upper and bottom jaws in LATR is simple compared to teeth of ATR, where be bending and crest are not clear (Fig. 31, 35, 52, 53 and 54).

The pharyngeal teeth appear transparent in soft state except the peakal part, which appears in a brown color (Fig. 61 and 62). Tooth shaft pigmentation with alizarin red stain in both the upper and bottom jaws of the pharynx, while the peakal part maintains brown color that was in its soft state (Fig. 43, 45, 54, 55, 58, 65, 68, 70, 72, 73, 74, 75 and 76).

Discussion

The teeth were found in almost all vertebrates and were associated with oral cavity. The teeth from exoskeleton structures (Shimada et al., 2013). In fish, the teeth were found in different regions, found in several locations, especially in mouth and pharynx (Debiais-Thibaud et al., 2007), as well as other locations such as surface of oral cavity (Hassan, 2013) and tongue (Constantinescu et al., 2015). This difference in teeth locations is due to different species, their environment and their eating habits (Pasco-Viel et al., 2014), while the teeth lost in some species such as fish *Garra rufa* (Scets et al., 2015). In molly fish was the size of mandible is larger than maxillary in mouth. The mandible is connected to hyoid arch to hang it with acoustic vesicle, this means that bottom jaw covers upper jaw in the mouth. Also as for pharyngeal jaws, the upper jaw is smaller and convex shape, the bottom is larger than it and concave shape, the surface of the jaws attached on each other, Occlusal Surface, the outer edge of bottom jaw covered the upper jaw in pharynx, and this harmony between the jaws may have a role in correlation between them, which reflected on processing of food particles during feeding process of fish. Although there have been few studies on teeth in some species of Poecilia genus, to which molly fish belongs to it, but these studies did not give detailed information, and dealt of teeth in mouth region only (Schultz, 1966: 1969; Lewis et al., 1999). The current study showed that molly fish has teeth in both mouth and pharynx regions, and it is therefore necessary to conduct a detailed study on teeth of other species of this genus.

The teeth of *P. latipinna* in mouth different in shape, size and location, this characterizes it into two outer and inner rows, this is similar to a description in study of Lewis et al. (1999) on three species of this genus are *P. latipinna* and *P. Formosa* and *P. mexicana limantouri*. The description they showed for outer and inner teeth was similar to that of current study in studied fish, but it differs in numbers of inner teeth, P. latipinna in current study had less teeth than that which Lewis et al. (1999) showed in their study. This may indicate that teeth number is not determinate taxonomic character between these species. The present study is proved existence of pharyngeal teeth in this fish. Therefore, the present study given important to describe shape, number and pattern of pharyngeal teeth in both upper and bottom jaws, as well as oral jaws teeth. Since shape and pattern of teeth are important features in taxonomic studies (Miller, 1999).

Inner teeth row in mouth stretched on dorsal lateral side of upper jaw, while the presence of these teeth was confined to the front in bottom jaw, this was not described in study of Lewis et al. (1999), which was conducted on the three species mentioned above, in which analysis of teeth (shape, number and distribution pattern) for taxonomic purposes. Also this has not been mentioned in the previous studies on some species such as *P. lucida* and *P. monach* (Schultz, 1966 ; 1969).

Teeth of fish is homodont (Ohazama et al., 2010). This is what appears at first sight in sailfin molly fish, their teeth are similar in terms of pointed ends and cylindrical shaft, this generally suggests that teeth of fish are similar in their location of mouth and pharynx, but it was observed from careful check of teeth shape that some of them contain crest and others do not contain it, thus the fish teeth are not homodont. However, reference to foundations of the division of teeth mentioned by Katzenberg and Saunders (2011) confirms that this feature do not divide them into two different types. But it can be said that the teeth containing crest are modified from first teeth to perform a especially certain function for species, thus can be counted as a secondary type emerged from the first type, This means that teeth of sailfin molly fish is Homodont.

The study also classified teeth of sailfin molly fish as Canines teeth, because Its shape is almost sharp and end pointed, It is also used to catch of nutrient materials and stabbed to maintain them. Oral jaws teeth were also classified as Antimeres because they are identical in right and left halves of each jaw, but they can not be called Isomeres because arrangement pattern of teeth and their number for each part of upper jaw does not match of its counterpart on bottom jaw, the inner teeth of upper jaw extend on dorsal lateral side for two parts of jaw, as well as the difference in number of outer teeth between the jaws. The same is true for pharyngeal teeth, they are Antimeres and not Isomeres at the same time, Because of the similarity of the pattern between two parts of each jaw and the difference between the upper and bottom jaws. These labels are based on what is stated by Katzenberg and Saun ders (2011).

The inner teeth of *P. latipinna* are monocuspid, as well as species *P. formosa* and *P. mexicana limantouri* (Lewis et al., 1999) and *P. lucida* Schultz (1969) have inner teeth monocuspid, while Schultz (1969) and Alda (2013) were mentioned that *P. monach* and *P. sphenops* was owned inner teeth tricuspid.

The current study identified two regions distinct on bearing structures of teeth at the roof and bottom of pharynx, depending on regularity of teeth, are ART and LART, the first region has clear attributes to regularity of teeth in clear rows. It is logical to vary the number of teeth in ART because of difference rows length, which fits with shape of triangular bearing structures. The details of small structures usually fit with general shape of structures which it contains (Ross and Pawlina, 2016). The shape of upper pharyngeal tooth differed from bottom pharyngeal tooth, although it contained the crest because the first less flat and more curvature. The current study showed that pharyngeal teeth of *P. latipinna* in both upper and bottom jaws were monocuspid.

The difference of terminal end shape of teeth terms of cuspid number between species indicates importance of use this feature in the taxonomic studies of these species, but it seems that hybridization has a role in difference this characteristic, as occurred between *P. lucida* which contains inner teeth monocuspid and *P. monach* which contains inner teeth tricuspid, sovereignty was to *P. monach*, resulting a generation has inner teeth tricuspid (Schultz, 1969). Experiments conducted by Fraser et al. (2013) on basis of principle of gene manipulation expressed on this feature resulted in results transformed teeth from bicuspid in some species of cichlids to tricuspid and vice versa during process of regeneration and replacement of teeth, This may not be useful to taxonomic studies when considering possibility of cross hybridization between species (Schultz, 1969; Fraser et al., 2013). Therefore, it is possible to resort to qualities of pharyngeal teeth of these fish, especially if studied in other species, the information presented by current study may be useful in establishment of a database of pharyngeal teeth of sailfin molly fish. The number of teeth, their arrangement and their shape play a major role in food capture and treatment (Pasco-Viel et al., 2014). Fish that feed on plankton tend to reduce tooth size and number (Linde et al., 2004). On this basis, possession of sailfin molly fish a row of large outer teeth and rows of small inner teeth confirming that they are nutrition variety. Teeth orientation of Aboral clearly reflects the predatory behavior of fish (Constantinescu et al., 2015), the curvature of outer oral teeth of molly fish is clear evidence that it feeds on a food substance that may be alive or non-living. The curvature in the teeth gives strength and the greater stability when the prey is caught and the implantation in it and the teeth are able to holding things and maintaining them and and preventing their escape, as in grouper fish (Hassan, 2013). The inner teeth of sailfin molly fish, which have a peaka part with a pointed end, curved near the terminal end, and these teeth are usually smaller and more numerous compared to outer teeth, may have a role in supporting the outer teeth in keeping the prey through the hole of prey and clinging to paralyzed. The results of monitoring fish behavior during the feeding process also showed that molar fish devoured their bairns after births directly.

After suggesting the role of oral jaw teeth of sailfin molly fish in the holding of food and prevent the escape of prey, it means that food treatment will be in the pharyngeal region, pharyngeal teeth differ in their handling of food depending on their different shapes and sizes. in some species take shape molariform and specialized to grinding (Greenwood, 1965). Fish that live among rocks usually have a small number of large, spaced conical teeth, consisting of two or three rows used to crush small animals and plankton (Tawil, 2011), while other species have hundreds of small teeth, which are organized in 10 - 15 rows used to friability of algal and fine plants (Fraser et al., 2013).

In other species, the teeth are conical, thin and long, with small grooves at the ends, which enable them to cutting and shattering of food when it pass. (Miller, 1999). The pharyngeal teeth of sailfin molly fish in the upper and bottom jaws at the roof and the bottom of pharynx respectively, characterized a monocuspid and the presence of cerst on ventral surface of peakal part of tooth, which gives mechanical strength for this part, as well as plenty number of teeth and curvature at peakal part, and teeth regulation, the teeth at the roof tend to reverse their tendency at the bottom. This suggests that teeth intertwine during movement of pharyngeal jaws horizontally and meet their crest, and crushing food and crush it.

The morphologica study of teeth is described as consisting of two parts: cylindrical shaft and peakal part, It based on a bony base, that is part of tooth. Tooth base connected to bones of bearing structures in both oral and pharyngeal regions. Schultz, 1966; Darnell and Abramoff, 1968).

The description was limited to peakal part of the tooth and shaft cylindrical, which was indicated to as tooth base only. But, it was found that the tooth itself is based on a base that connects between the teeth on one hand and bone of bearing structure on the other, and although it is bony - the response with a high degree for specialized stain - and the joining borders between it and bones is unclear, but the cylindrical shape of teeth bases, jointed it with tooth shaft and their association with each other. All that suggest that it is part of tooth and must called tooth base.

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