IRAQI Academic Scientific Journals
العراقية المجلات الأكاديمية العلمية

ISSN:1813-1638
The Medical Journal of Tikrit University
Journal Homepage: http://mjtu.tu.edu.iq

MJTU
The Medical Journal of Tikrit University

Morphological and Structural Study of Neonatal Filiform Papillae

Elham M. Mahmood[2]
Tikrit university college of medicine
Department of Anatomy & Histology
el.majed@tu.edu.iq
orcid.org/0000-0001-5507-8022
Samira Abdul-Hussain Abdullah3
Tikrit university college of medicine
Department of Anatomy & Histology
Drsamira2018r@tu.edu.iq

Received: 32/06/2025
Revising: 24/06/2025
Proofreading: 24/06/2025
Accepted: 30/06/2025

KEY WORDS:
Filiform Papillae , Neonatal, Tongue.

ABSTRACT

Introduction: This work was conducted to investigate the morphology and histological structure of the filiform papillae in neonate to assess their cellular composition ,keratinization and arrangement in the lingual mucosa .The results contribute to know the early functional maturation of the tongue surface ,which is essential for new born feeding and sensory adaptation.

Materials: Thirteen tissue specimens taken from the anterior two- third portion of the dorsal surface of the tongue of Thirteen full-term stillborn neonates . The samples were fixed in 10% neutral buffered formalin and processed for light microscopy

Result: The papillae appeared structurally immature, in the form of small prominent slider–like structure covered with thin para-keratinized stratified squamous epithelium with absent of taste buds and secondary papillae, which means that, the primary papillae is without branch to form secondary papillae, because they were not fully mature. while it was noted the interpapillary regions had thin none keratinized epithelium and loos of connective tissue without secondary papilla or ridges .The mean of the epithelial thickens for filiform papillae in neonates was 54.9µm , while the mean for the papillae height was 86,6 µm .

Keywords : Filiform Papillae , Neonatal, Tongue

DOI: http://doi.org/10.25130/mjotu.30.1.1

INTRODUCTION:

The tongue plays a vital role in feeding, taste and oral sensation. The dorsal surface of the tongue is unlike anywhere else in the oral cavity. Its covered by special epithelia contain varies lingual papillae, among which are filiform papillae .Papillae begin to appear during the fetal stages , and after birth morphological changes begins. [1,2].

Filiform papillae are the most numerous type of papillae in human tongue ,responsible for the tongue texture and sensation. Distributed along the entire anterior part of the dorsum of the tongue and are consist of conical-shaped structures, each with a core of connective tissue covered by keratinized epithelium. They form a hard rough surface which is involved in mastication. With electron microscopy, filiform papillae of the human tongue have been seen to contain 5–12 hairs which are covered with a massive plaque of microorganisms [3,4].

Most studies and research's conducted previously aimed to identify the changes that occur in the structure of the tongue ed in 10% neutral buffered formalin for 24 hours at room temperature .Following fixation , tissues were dehydrated in a graded ethanol alcohol series , then cleared in xylene, embedded in paraffin wax , blocking, and 5 µm thick sections were obtained using microtome. Sections were mounted on glass slides and stained with Hematoxylin and Eosin. [7,8] .For each specimen, 3-6 filiform papillae from each slid were selected to measure

(papilla height um & epithelial thickness of each papillae um). By using a calibrated eyepiece for the measuring procedure.

RESULTS:

Filiform papillae distributed throughout the entire anterior two- third of the dorsal surface of the tongue, as small finger -like projections with rounded and partly blunted tips (figure 1).

Each papilla consisted of a connective tissue core, covered with thin para-keratinized stratified squamous epithelial .The central connective tissue of the neonatal filiform papillae is simple and showed absence of secondary papillae which is usually found in adults. The connective tissue contain a fine collagen network, fibroblasts and blood capillaries ,fat cells were absent (figure 2). The interpapillary regions were covered with nonkeratinized stratified epithelium and appeared thinner than the covering the tips of the papillae ,connective tissue of its core contains few fibers and blood capillaries were rare in this region . (Figure 3).

due to the influence of age and the accompanying changes disorganization of the lingual papillae and taste buds loss of their function and atrophy ,with high deposition of fat and collagen fibers in tongue tissue[5,6].

Very few studies have focused on the structure of the papillae. Thus, the present work focused on the histological and morphological composition of the filiform papilla in neonates, as an important structure extends throughout the entire anterior two third of the dorsal surface of the tongue and its great importance in assisting in the feeding process in this age group which depends mainly on liquid nutrition.

MATERIALS AND METHODS:

Thirteen specimens of tongue , from stillbirth neonates were dissected from the anterior part of the tongue after consent of the parents was obtained and approval from the institutional ethics commits .The anterior two –third of tongue were dissected and sectioned (about 6 mm thick),was then immediately fix

The basal layer, the deepest layer of the surface epithelial, resting on basement membrane and usually was either cubic to low columnar in shape with large central nucleus and the cytoplasm has basophilic staining , while the superficial cells specially in the interpapillary area shows high accumulation of glycogen granules in their cytoplasm (Figure 4 &,5). The present work shows the neonatal papillae were small in size, short in height. The mean value of the epithelial thickens for papillae in neonates was 54.9µm , while the mean value for the papillae height was 86. 6 µm.

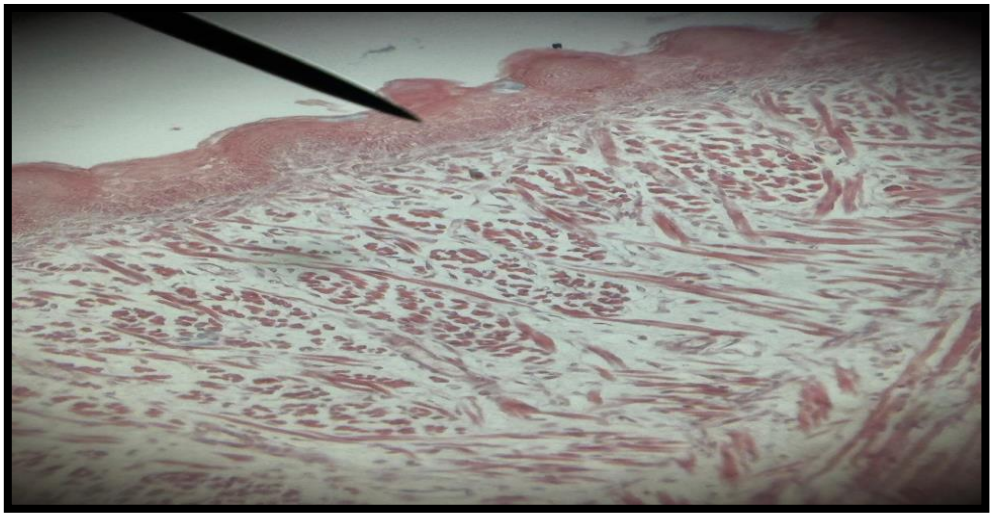

Fig.1 : The filiform papillae as small finger -like projections with rounded end and partly Blunted, covered with parakeritinized stratified squamous epithelium, devoid of taste buds (H&E .X 40).

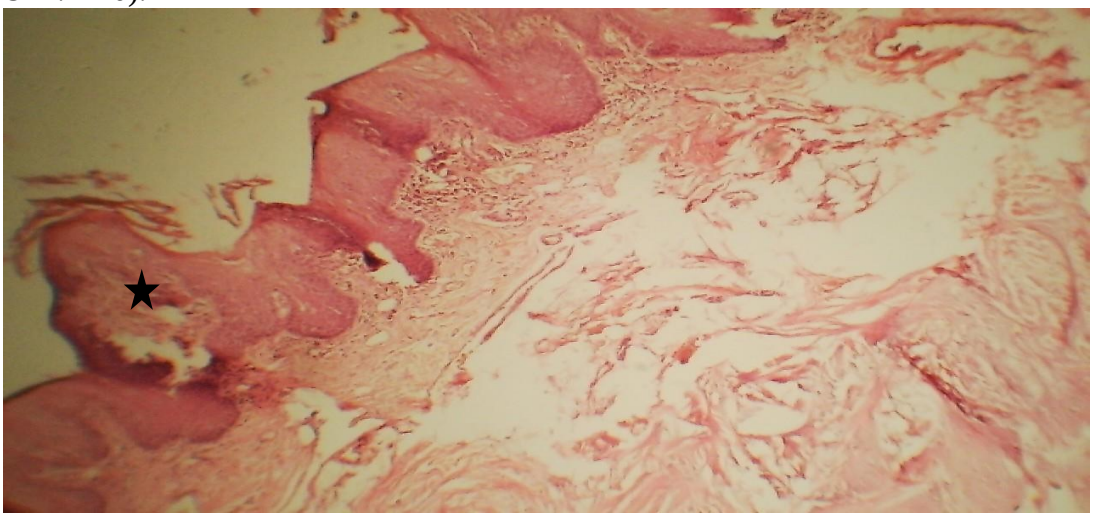

Fig.2 : The filiform papillae surface was covered with thin para-keratinized stratified squamous (black arrow),the central connective tissue contains fine collagen fibers, fibroblasts, and blood vessels, and a region of fat cell infiltration (black star) (H&E, X 100).

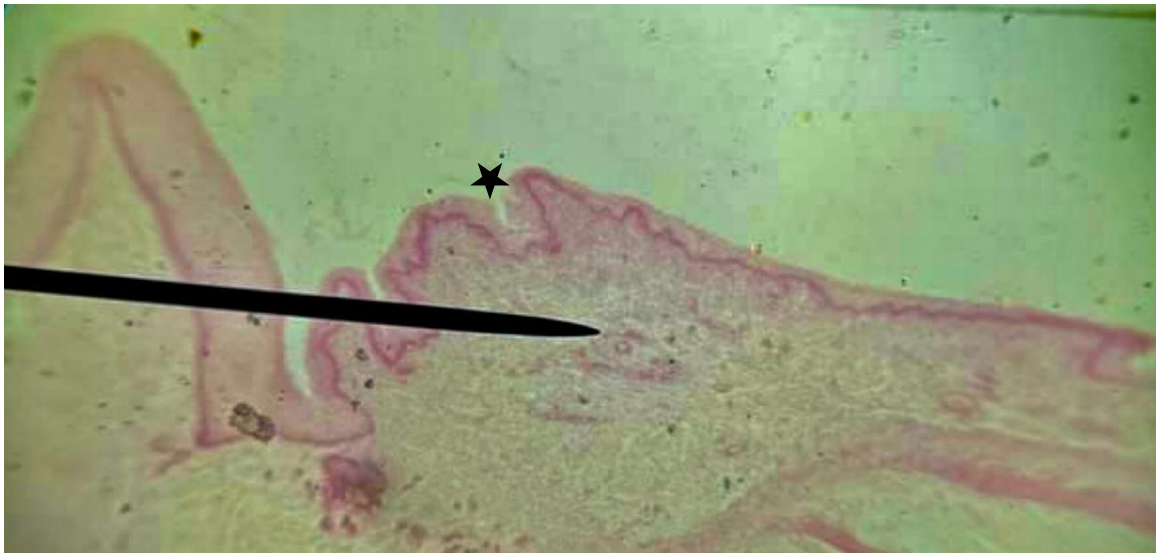

Fig. 3: The inter papillary region (black star) was covered with thin nonkeratinized stratified squamous epithelium ,connective tissue of its core (thick black arrow) contains few fibers and blood vessels (H&E .X 40)

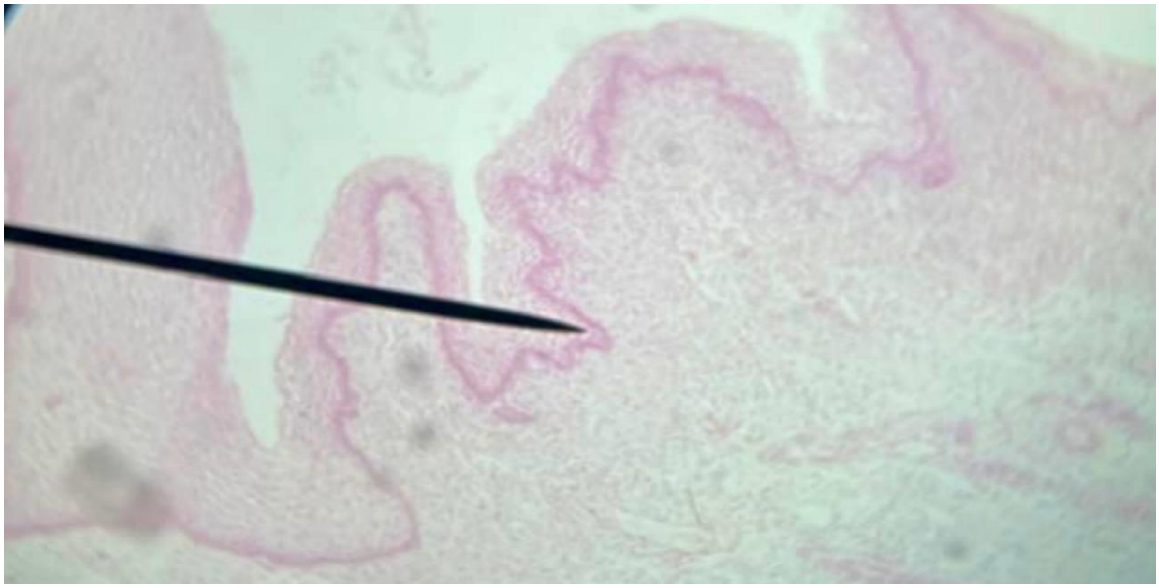

Fig. 4.: The deepest layer of the surface epithelium of the neonatal papillae, whose cells with high mitotic divisions figure (thick black arrow) (H&E, X 40).

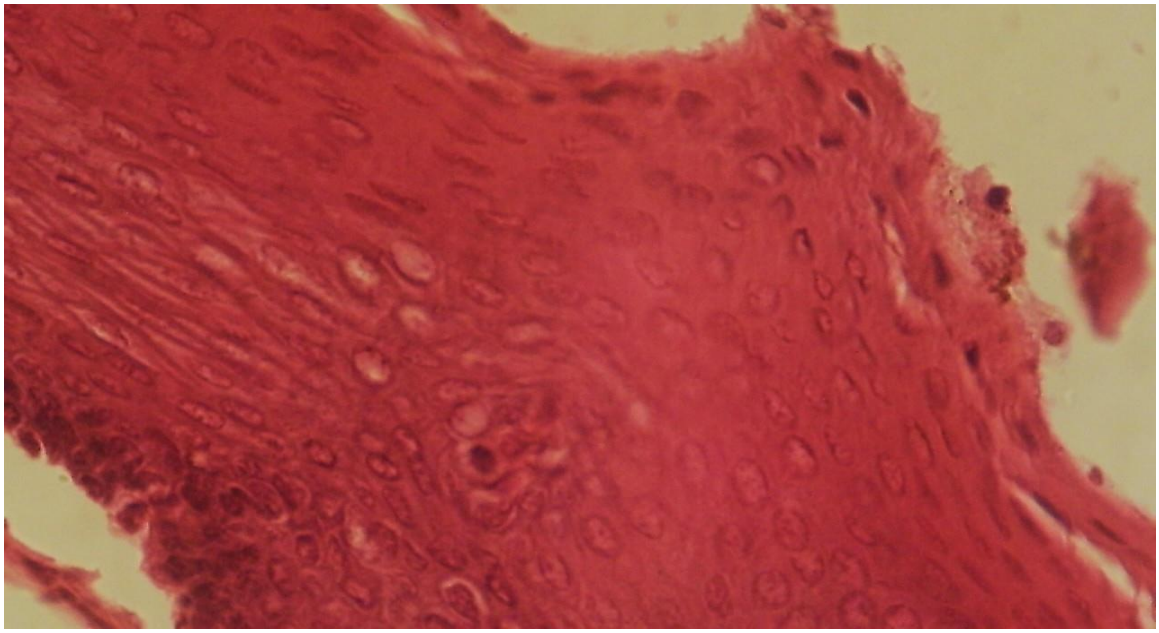

Fig. 5. : The deepest layer basal layer of the surface epithelium of the neonatal papillae, whose cells are either simple cuboidal or low columnar (black arrow) (H&E, X 400).

DISCUSSION:

Results of this study showed , the covering surface of neonatal filiform papillae were para-keratinized 54.9µm whereas the epithelium covering the interpapillary regions was nonkeratinized. These results consistent with those of Park et.al [9] , Lee et al. [10] and Kwon HJ [11] , they suggested that there ,are different populations of keratinocytes related to different functional requirements, or the different pathways of differentiation of keratinocytes are related to different functional requirements.

Neonates feeding is based on milk and liquids mainly on sucking ,therefore ,it does not need friction especially during the first months, approximately the first six months of their life. With the eruption of teeth and the change in the nature of food, the contact area of the tongue surface changes leads to some changes in the nature of its structure and morphology , especially its surface epithelial so it gradually begins to keratinize and the papillae ends turned to be pointed.

The connective tissue core of stillbirth filiform papillae was loose and was incompletely developed and without ridges or secondary papillae. These finding consistent with[5], who mention epithelial mesenchymal interactions play an important role in the development of many organs such as teeth, salivary glands, hair and feathers, but do not occur in the differentiation of filiform papillae. This may simply be due to the relatively small size and close spacing of filiform papillae compared with other epidermal derivatives.

High aggregation of glycogen granules in cytoplasm of surface epithelium ,this finding consistent with Lee, et. al[11], who suggested that, the accumulation of glycogen in newborn tissues may be related to repaid growth during development that requires a sustainable source of energy to continue. Also the study clarify that the basal layer of the

stratified squamous epithelium appears cuboidal to low columnar with basophilic reaction this result was consistent with Mcfall WT,et. al [13]. Regarding the morphometric results ,there's no similar studies for comparison. of the thickness of epithelium and the height of the papillae ,there is no previous similar study for comparison.

CONCLUSION:

- This study demonstrates that neonatal human filiform papillae, as observed under light microscopy, appear structurally immature yet functionally preparatory in architecture
- Stratified squamous epithelium exhibits partial keratinization – rather than in mastication.
- agreement with preparation for transitional oral function in newborns.
- Morphometric results confirm that neonatal papillae are shorter, blunter, and less dense.
- These results confirm, filiform papillae at this age, primed for their role in sucking

CONFLICT OF INTEREST :

There is no conflict of interest.

ACKNOWLEDGEMENTS :

The author like to extend sincere gratitude to those who have contributed to the completion of this dissertation, firstly to her colleagues for their collaborative spirit, intellectual contributions, and unwavering support, special thanks are due to the administrative and technical staff of [Tikrit University College of Medicine] for their assistance and support, which have been crucial in the smooth progress of this research.

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