

A Review of Evolution of Premolar in Mammals

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Abstract: *The morphology and structure of the mammalian premolar teeth varies in all species. The variation occurs due to the evolutionary changes of the premolar. Even though the premolars have almost the similar function and morphology as the molars, but it is not homologous to that of the molars. Furthermore, sometimes the morphology of premolar and canine is almost alike but in the aspect of occlusion it differs from each other. These variations occur due to the evolution of the teeth. There are some minor similarities between each tooth because of the common developmental origin.*

Keywords: Evolution, Mammalian tooth, Premolar

1. Introduction

Teeth are one of the most important elements in the maxillofacial region. Many paleontological and neontological disciplines are focus on teeth as the teeth has essential evolutionary information. This is also because of their preservation in fossil records and paradigm status in researches on developments. The focus of this paper is to review the evolution of premolar in mammals.

2. Materials

This paper is based on numerous secondary materials such as articles which contains corresponding information on the topic of the paper. I have search for information in various search engines in internet. There were many articles which were related to this topic but only about 25 articles was related to my review topic. I include only about 12 articles which I find really appropriate to my review topic.

Author(s)	Publication Date	Title
Cope, E. D.	1887	The Origin of the Fittest
Osborn, H. F.	1888	The Evolution of the Mammalian Molar to and from the Tritubercular Type
Mahn, R.	n.d.	Bau und Entwicklung d. Molaren bei Mus und Arvicola (Construction and Development of molars in Mus and Arvicola)
Dybowski, B.	1889	Studien über die säugetierzähne (Studies on the Mammalian Teeth)
Scott, W. B.	n.d.	The Osteology of Poebrotherium
Schlosser, M.	n.d.	Die Affen, Lemuren, etc., (The monkeys, Lemurs, etc.)
Cope, E. D.	1884	Tertiary Vertebrata
Thomas, O.	1892	On the Species of Hyracoidea
Rose, G.	1892	Ueb. d. Entstehung und Formabänderung d. menschlichen Molaren (Formation and Modification Form of Human Molars)
Taeker, J.	1892	The monkeys, lemurs, etc. (To the Knowledge of Odontogenesis in Ungulates.)

3. Discussion

Cope and Osborn elaborate the evolution of the mammalian molar tooth up to and from the tritubercular pattern. They have also proposed the nomenclature for different cusps or elements that forms the mammalian tooth. Both these proposals are widely accepted by morphologists. Based on these proposals, the primary form of tooth in both maxilla and mandible that is shown by many reptiles is a perfectly simple cone.^{[1],[2]}

In the morphological comparison, therefore, the front end of mandibular molars to the rear end of a maxillary molar must be considered accordingly. It also compares the shape of the individual teeth highlighting the great similarity between the third posterior maxillary molars and first molars in the lower jaw. M₂ is fairly uniformly in both jaws, therefore keeping the lower jaws M₃ M₁ corresponding to the upper jaw. As it can be initially set up on the basis of the anatomical facts for melt-fold teeth of Arvicola, the allegation of the direction of the upper and lower rows is reversed.^[3]

The anterior ends of the mandibular molars are homologous with the posterior end of the maxilla ones and vice versa. This consideration was advanced by B. Dybowski, Fleischmann, and Mahn was later derived from form resemblance and assumption in Arvicola.^[4]

Premolars have slightly different history. The elements for function and position of molar are not homologous with that of the premolar even when the premolars are completely molarified. The premolars' talon is similar to that of the molars and as it has hypo- and entocoids.^[5]

Even though, the mandibular first premolar has the morphology and function that is slightly similar to that of the canine, but via the aspect of occlusion it differs as the mandibular first premolar occlude behind the maxillary canine. Schlosser is the first person to identify this vast change in lemurs.^[6]

The statement "The second premolar with single compressed longitudinal crest and without internal tuberosity or cusp in Leptictis" is incorrect in all events^[7]. Schlosser consider the Galencynus æningensis of Owen is outstanding for the presence of the anterior cusp upon premolar^[6].

Although we could not affirm that the degrees of premolar problems are exhibited already, yet it is adequate to support the dental evolutionary stages^[8]. According to the articles of Taeker and Rose, the homological complication of molar and premolar was studied from embryological origin^{[10], [11]}. Taeker have said that the homologies of the primary molar teeth and the permanent premolar teeth are almost similar. He has also discovered that the premolar erupts at the position where the primary molar was positioned before.^[12] Rose has discovered that the homologies of the cusps of premolar and the primary molar are almost similar as well. Both this discoveries was also confirmed by the results of paleontology.

4. Conclusion

Evolution of premolar has shown a vast change in the morphology, function, position and etc. The evolution has caused the morphology of premolar to be different from that of the molars and canines in overall, even though slight similarity in the shape of the cusps. The position of the premolars also differs from that of molar and canine as it is situated between the canine and the first molar in both maxilla and mandible. The function of premolars also differs from that of molars and canines due to the evolution of premolar.

References

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