MINI REVIEW ARTICLE

Role of Mastication in the Digestion Process: A Review

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Abstract
Mastication means chewing of the food. It is the process by which larger food particles are converted into smaller and fine ones with help of saliva. Without the mastication process in humans and other mammals the larger food particles will not get converted into simple forms which can lead to indigestion. Hence, present review focuses on the process of mastication which is accompanied by tooth, salivary glands and facial muscles as food is necessary for every living beings to continue their life cycle, so the process of chewing or mastication helps in releasing the essential nutrients and vitamins as the food gets converted into simple form and it gradually gets absorbed in the blood streams from the walls of the intestine. Finally this review signifies the process of mastication because proper mastication leads to proper digestion which is ultimately one of the keys of healthy body.
INTRODUCTION

Mastication is the process of breaking down of food and thus making it easier to swallow. Various neuromuscular and digestive activities are involved in the process of mastication. The upper and the lower jaws exert pressure in between the teeth which as a result grinds the food present inside the mouth. In order to evaluate the force and the physiology of the masticatory muscles it can be calculated from the electromyographic recordings.1 Mastication helps in the major function to pass the nutrients into the body cells and satisfy the basic energy requirements in the body. The major nutrients absorbing part in the body is the small intestine. Thus, after reaching the digestive tract various chemical and mechanical forces are involved in converting the smaller particles into more smaller molecules for release of energy.2 It must be kept in mind that a good mastication process is directly proportional to the more amount of saliva produced and the more the saliva is produced which contains the more amount of water which ultimately binds the food particles and makes it slippery for swallowing as the relationship between saliva and chewing are interrelated to one another therefore during mastication process the mechanoreceptors present in the gingival tissues are stimulated which results in the flow or secretion of the saliva.3 The jaw opening may be accompanied by mechanical stimulation of the lip. It has been observed that after the birth the baby cries and sucks the milk from the breast of the mother; therefore baby has to learn it for the purpose of chewing or swallowing.

MECHANISM OF MASTICATION

It has been previously discussed that mastication means breaking down of the larger food particles. So in order to perform this function a mechanism or a process is followed which ultimately leads into a good mastication. Mainly the breaking down process of the food matters are a highly organized complex of neuromuscular and digestive activities. The essential components that the mastication system possesses are the teeth, temporomandibular joints, the lips, the cheeks, the tongue and the salivary secretions. These components of the mastication system help in triturating of the food mixed with saliva and then transporting it to the digestive canal.1

The most important muscles which deliberately help in the mastication process are temporal, maseter, the medial pterygoid, the lateral pterygoid and the digastrics muscles. However, some other muscles are also involved in this process. The process is started from taking the food inside the mouth which is also called as ingestion to its chewing and swallowing. Before swallowing the food the larger food particles are reduced in a much reduced size and then they are pushed back to the molar teeth where they are converted into much more finer state and mixed with saliva easier for swallowing.1 Moreover, it must be kept in mind that the breakdown of the food particles also depends upon the type of food particles or the food texture. The control of the mastication process and the suction seems to reside in the medulla oblongata, but are obviously under every individual’s control and will.

Trigemini are the fifth pair of nerves which accompany its inferior division and regulate the voluntary influence which includes the motion of mastication. The ninth pair of nerves depresses the jaw to open the teeth and the intrinsic muscles of the tongue.4,5 More than twenty muscles are responsible for the motion of the jaw which helps in clenching and grinding motion of the jaw.6 Mechanico-Statistical function is normally a selection process rather than specific motor response driven by sensory input. The selection of the food depends on the manipulation of the food by the tongue and to bring them on the surface of the teeth for further reduction. The chewing stroke will be ineffective if there will be smaller particle size for chewing.7 Peripheral sensory impairment affects masticatory performance in denate persons and also the tongue motor skill performs a good function in manipulation of the food.7 The activation of two simple brain stem reflexes which are - Jaw opening reflex and Jaw closing reflex, which co-ordinates the rhythmicity of the mastication process.

Periodontal ligaments receptors are responsible for the learning of the chewing process a baby after birth.1 Thus, quality of a chewing depends upon the type of mastication. A good mastication leads into good chewing and healthier digestion and good absorption of the nutrients from the food.
MUSCLES INVOLVED IN MASTICATION

The principal three muscles which are involved in the process of mastication are:

- Pterygoid muscles
- The temporal muscles, and
- The masseter muscles

Pterygoid muscles are those whose basic function is to depress or elevate the mandible or to produce lateral excursions of the mandible. The temporal muscles are those whose function is to elevate the mandible and activation of the posterior fibres. The masseter muscles are used for producing the maximum masticatory force and also to elevate the mandible. These muscles play an important role in mechanical clenching and grinding of the food which produces enough force so that the food inside the mouth is easily grinded. The molar teeth attached with the jaw have the main key role of mechanical grinding and compression of the food. Sensory feedback plays an important role in the control of the mastication process, which contains the following:

- Epithelial mechanoreceptors
- Periodontal afferents
- Temporomandibular joint afferents
- Muscle afferents

This sensory feedback mechanism helps in proper co-ordination of the whole mouth which includes the tongue, lips, teeth, jaws along with the food. It can also be noted that this or the type of food materials that we take inside the mouth for the mastication can influence a lot as mastication depends on the type of food we take. The cycle of mastication changes according to the different type of food matter that we take or consume.

USEFULNESS IN DIGESTION

For the process of mastication the cheeks, tongue and the teeth for grinding plays a very important role. Saliva acts as a lubricant which helps in swallowing the food very easily and the enzymes such as amylase which is present in saliva plays a major role in breakdown of the carbohydrates which are present in the food. After swallowing of the food it travels through the oesophagus reaches the stomach where it is further breakdown into more simple forms and the process of digestion is carried out.

As due to mastication, the disintegration of the solid foods in human stomach takes place and the bioavailability of the nutrients in the body is possible for normal functioning of the body and for its proper growth. The digestion of essential elements like starch and lipids mainly takes place due to mastication. In mastication the bitting force is considered as the most important one, because the more stronger the bitting force the more good will be the mastication with finely divided food particles which will be more easier to swallow and will get more easily absorbed at the intestine. In the process of mastication the taste and texture of the food are perceived and have their influence in the chewing process. Without proper mastication the foods does not gets digested in the intestine nor the nutrients are properly absorbed which leads to indigestion. So, a good mastication always helps in proper digestion leading to good health.

CONCLUSION

Mastication thus can be concluded as a very useful process for the basic metabolic activities to be carried out in the body. Without a good mastication the basic metabolic activities might be severely affected. It can also be called as a chewing cycle which depends on the type of food taken. Tooth plays a very important role in the process of mastication as it helps in size reduction and so its maintenance must be done in a proper way. Loss of any tooth could lead into an improper mastication process and can lead to indigestion. The salivary glands also has a very important role which lubricates the food helps in trituration and its easier swallowing. Also the mandible movements are very important in reconstructing of the missing teeth. The mechanical force mainly depends upon how strong the tooth is, so proper maintenance is very necessary.
DECLARATION OF INTEREST
It is hereby declared that this paper does not have any conflict of interest.

REFERENCES