



## ANATOMO - MORPHOLOGICAL FEATURES OF AN EDENTULOUS UPPER JAW

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### ABSTRACT:

**Introduction:** The success of prosthetic and implant treatment is determined by the knowledge of the anatomical and morphological features of upper and lower edentulous jaws and the identification of landmarks in the prosthetic field that contribute to accurate planning of the complete rehabilitation of the oral cavity.

**Purpose:** This article aims to present and analyze anatomical and morphological features of an edentulous upper jaw that are important for the prosthetist.

**Materials and methods:** A search was conducted in the period from October 2022 till December 2022 in the electronic databases PubMed, Google Scholar, Science Direct and several other bibliographic databases using the following keywords: anatomical features, upper jaw, atrophy, residual bone, complete prostheses, edentulous patients. Only literary sources in English, German, Bulgarian and Russian language were included.

**Results:** A total of 1076 articles were identified by the literature search, and the title and abstracts of the articles were examined. Twenty-eight original research studies met the inclusion criteria. Data and evidence were extracted for the importance of anatomical landmarks and features of the prosthetic field in case of complete tooth loss during prosthetic treatment.

**Conclusion:** Individual anatomical and morphological features, age-related and functional changes that occur after complete tooth loss create conditions for prosthetics that must be tailored to the specifics of each individual clinical case and require an individual approach.

**Keywords:** Edentulous patient, Edentulous jaw, Atrophy, Residual bone, Complete denture,

### INTRODUCTION:

An individual who has completely lost his teeth meets the criteria for physical disability and disturbed mental comfort. [1, 2] Total edentulous rehabilitation has been shown to significantly improve oral health-related quality of life. [3] Complete dentures are the means of choice for the restoration of masticatory and speech functions and aesthetics. [4] Proper planning of total dentures is directly dependent on knowing and analyzing the anatomical and morphological changes occurring in the oral cavity after complete tooth loss. Of leading importance is the knowledge of anatomical landmarks in the prosthetic field, which provide guidance in choosing a treatment plan. [5]

### PURPOSE:

The purpose of this article is to present and analyze anatomical and morphological features of an edentulous upper jaw that are important for the prosthetist.

### MATERIALS AND METHODS:

A search was carried out in the period from October 2022 till December 2022 in the electronic databases PubMed, Google Scholar, ScienceDirect and several other bibliographic databases using the following keywords: anatomical features, upper jaw, atrophy, and residual bone, in English, German, Bulgarian and Russian language. The total number of publications accessible was 1076. In the way of adding an additional criterion – the period of issuing after 2000, the selection covered 313 publications. With the use of another additional indicator – the keywords “complete denture “and “edentulous patient, “28 publications were selected and analyzed.

### RESULTS:

#### *Anatomo - morphological features of the upper jaw.*

Edentulous jaws are classified according to several main characteristics, which include: shape, type and degree of atrophy. [6] The resorption characteristic of the upper jaw is centripetal. [7, 8]

According to Popov, there are three main and very transitional varieties in the shape of the upper jaw: ovoid, pointed and square. Modern authors indicate that the shape of the edentulous upper alveolar ridge can be: rectangular,

oval or triangular. [9]

Alveolar crests undergo significant quantitative and qualitative changes in size after extraction, especially during the first 3 months. [10, 11] The most significant are the changes in width, the quantitative dimensions of which are directly dependent on the bone morphotype, the characteristics of the extraction wound and the degree of trauma. [12, 13,14] Jaw atrophy varies individually in amount, rate, and location and is influenced by a variety of factors. [15, 16, 17, 18] It is the result of bone remodeling affecting the external and internal structure, which is dependent on anatomic, metabolic, functional and prosthetic factors. [19] In prosthetic dentistry, there are several types of atrophy: physiological (irreversible process), afunctional and hyperfunctional. Atrophy can also be: symmetric, asymmetric, equable and unequable. [6] The type of atrophy depends on the sequence of tooth loss as well as premature extractions. [20, 21] According to an analysis by Keren Shemtov-Yona, the quality and atrophy of bone is different in different parts, depending on the presence or absence of teeth. [22] As a result of atrophic processes, the alveolar process and the alveolar bone can acquire different shapes: sharp, mushroom-shaped, oval or flat.

Schröder defines 3 degrees of atrophy of the alveolar bone of the upper jaw: [23]

- The first type (most favorable for prosthetics)
- The second type has a moderate degree of atrophy of the alveolar process
- The third type (creates great difficulties)

A. Doinikov offers a classification of toothless upper and lower jaws with an emphasis on unequal atrophy and identifies five degrees of atrophy: [24]

- First degree - both jaws have well-defined alveolar ridges covered with resilient mucosa.
- The second degree (the average degree of atrophy of the alveolar ridges) is with moderately defined maxillary tubercles, medium depth of the palate and a defined torus.
- Third degree - complete absence of alveolar growth, sharp reduction in the anatomical dimensions of the body of the jaw, flat palate, wide palatal torus.
- Fourth degree - defined alveolar ridge in the frontal region and significant atrophy in the distal parts of the jaws.
- Fifth degree - defined alveolar ridge in the distal parts and significant atrophy in the anterior part of the jaws.

Boyanov classifies the degree of atrophy into three

main and one additional degree: [25]

- The first degree corresponds to normal afunctional atrophy of the alveolar ridges, which are rounded and well defined
- The second degree is due to senile or pathological atrophy, the alveolar ridges are reduced and covered with immobile mucosa
- Third-degree is due to senile or pathological atrophy in an advanced form, the alveolar ridges have almost disappeared, the immobile mucosa is a narrow strip along the ridge of the ridges
- The additional fourth degree represents severe atrophy with almost disappeared alveolar bone

The mucous membrane covering the prosthetic field is divided into three main types: mobile - in the area of the cheeks and lips; transitional - located between the mobile and the immobile; and fixed - covering the alveolar ridges and the hard palate. Depending on the thickness of the submucous layer ( tela submucosa ), the resilience of the prosthetic mucosa is determined. Four areas of susceptibility are observed on the upper jaw. According to the condition of the mucous membrane covering the prosthetic field, it is defined as: normal, hypertrophied and atrophied. [26]

The gingivo-buccal sulcus is defined as the transition between the immobile mucosa of the alveolar ridges and the mobile mucosa of the lips and cheeks. [6] The physiological limits of this fold are limited by the following anatomical structures - spina nasalis anterior, m. orbicularis oris, crista zygomaticoalveolaris, m. buccinators, m. incisive labii superioris. In the distal region, the gingivo-buccal sulcus is located in the paratuberal space next to the facies infratemporalis maxillae. [6] The boundary between the hard and soft palate is formed by the attachment sites of the tendons of the soft palate to the bony base of the hard palate. [27] This is the palatal border of the prosthetic field. Kurlyandky first introduced the concept of a valve zone. [28] According to him, this represents a functional complex only after the prosthesis is placed on the prosthetic field.

## CONCLUSION:

Individual anatomical and morphological features, age-related and functional changes that occur after complete tooth loss, create conditions for prosthetics that must be tailored to the specifics of each individual clinical case and require an individual approach.

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