Aesthetic guidelines for dentures that are natural-looking

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Summary

Natural-looking dentures have always been a great challenge for the dental technician or prosthodontist. With so many different brands of acrylic tooth systems on the market, it can be easy to overlook the basics of tooth shape and its relation to the physiology of the face.

In this article, I consider the morphology of the anterior teeth in particular. Tooth shapes vary enormously between individuals and to the untrained eye, a system of defining these shapes probably seems remote. However, if you look at the face as a whole, you will very quickly understand how nature constitutes the relationship between tooth shape and facial physiology through human genetic development (Figs. 1–3). This article will help you to identify the corresponding characteristics of tooth shape through a systematic approach suitable for each case.

First of all, it may help to peruse the illustrations in order to understand the system and the connections between the illustrations. Consider general anterior tooth morphology and you will recognise, in addition to the obvious characteristics, further specific individual features, like the difference between a central incisor and a canine. Although the variety of different shapes of the anterior teeth appears to be immense, this can be quiet deceiving. If one leaves aside the tooth positions and the colour of the tooth, the general morphology consists of two factors (Figs. 4–6). 1. the basic shape of the tooth, i.e. definitive width and 2. the marginal ridges or line angles of the tooth, which defines the optical width.

This correlation of optical width and definitive width leads to the different shapes of teeth. This morphological variety can be subdivided into three basic principles. These three fundamental archetype shapes are square (athletic), tapering (leptosomic or ovoid (pyknic). All other tooth shapes are considered to be hybrid shapes.

In 1914, Leon Williams suggested a now famous classification system of tooth shape, theorising that these three fundamental shape types are reflected in the “Kerrschmeric Construction Types” (facial outline types). The shape of the tooth is equal to the horizontally flipped shape of the face. For example, an athletically built person with an angular face would have square-shaped teeth (Figs. 7, 8, 13, & 16). A thin person with a peaked chin (leptosome) would have triangular-shaped teeth (Figs. 9, 10, 14, & 17).

Today, this classification of the tooth shapes based on the shape of the face is considered to be antiquated. Hence, it only serves as a very rough general guide when selecting a set of anterior acrylic teeth for a patient. In the fifties, the “dentogenic concept” by Fresh and Fisher spread across the US and then to other parts of the world. According to this concept, a “personality spectrum” can also be added to help obtain the shape of the tooth. Next to clinical, intraoral and facial relation considerations, the age, sex, and other characteristics of the patient are also considered. Today, taking all of these factors into account, one will most likely derive some sort of hybrid shape based on one of the three original basic shapes.

The concept of the three basic shapes with regard to the labial effect of...
A tooth can be demonstrated when viewed from the incisal perspective. A study by Yammamoto demonstrates this well (Figs. 13–15). From the incisal perspective, the relative flatness of the tooth crown, the width of the root and the shape of the labial and proximal growth lobes are generally not prominent when viewed from the incisal edge. The marginal ridges or line angles are somewhat strongly developed, although not as strongly as with the triangular type.

The marginal ridges or line angles develop in the sulcus and run parallel to the basic outer shape of the tooth towards the incisal edge. At the incisal aspect, the progression of the marginal ridges differs between unabraded juvenile teeth and worn aged teeth (Figs. 19–24). These different morphological characteristics are evident in the case of adjacent teeth, which makes the reconstruction of a single tooth quite difficult. A great deal of information is needed in order to rebuild the shape of a tooth and to recreate a natural, harmonious look. It becomes more complicated when it is necessary to replace the whole anterior segment or the dentition in an entire jaw. For this reason, the knowledge of the anatomical features of the single tooth is very important.

A further aid for determining the definitive width of the teeth is the width of the nose base, which agrees in most cases with the width of the front teeth (Figs. 25–27).

In his theory, Gerber suggests, amongst other things, that from an embryogenetic view the proportion of the nose base and the width of the nose root can be determined (Figs. 28–31).

When it comes to determining the length of the anterior teeth, some clues can be derived from the age of the patient. The length of the teeth is of great importance here. In vertical perspective, we distinguish between a full and thin lip and/or between a long and short upper lip (Figs. 32–34). Patients with short upper lips expose more of their teeth than patients with longer upper lips. The lips outline the space that is subdivided by the arrangement of the teeth, which typically determines certain aesthetic key factors. One can achieve harmony with the remaining parts of the oral region by weakening or intensifying the visible tooth areas.

Conclusion

In this article, I have only paid particular attention to the upper anteriors. The main reason for this is that the upper anteriors are aesthetically much more significant than the lower anteriors. The different shapes of teeth can be observed on both the upper and lower anteriors from the facial, mesial and distal aspects.

This method for achieving aesthetic harmony can be summarised as:

1. analysis of the dento-facial parts, i.e., lip-nose type; and
2. analysis of the intra-oral area, i.e., bite situation and remaining dentition.

A narrow nose base is an indication of slender anteriors.—Fig. 25: The nose base determines the width of the upper anterior teeth (Gerber).—Fig. 26: The average nose type correlates with the average width of anterior acrylic teeth—Fig. 27: A narrow nose base is an indication of slender anteriors.

Another decisive aspect of a successful natural reproduction is the design of the marginal ridges or line angles, which has an effect on the 3D appearance of the tooth.

Besides the shape and the width of the tooth crown, the width of the root is also a decisive factor. Up to now, I have restricted the consideration of the tooth to the labial and incisal view. In order to be able to replicate the 3D appearance of the tooth, we must also consider the labial curvature of the tooth (Figs. 16–18). From this point of view, the incisal triangle features can also be divided into the three basic components. For each individual case, it is then necessary to derive the respective hybrid shape.

After this has been considered, the following types can be derived from the mesial view:

- The oval anatomy type
  - The two well-developed labial marginal ridges are the key characteristic features of this anatomy type.
  - A strong labial depression and a wide labial transitional surface are present. The difference between the mesial- and the disto-approximal surface is noticeable. The distal face is wider than the mesial.
  - The growth lobes are generally not very prominent with this tooth shape type.

- The three-angled anatomy type
  - The mesial and distal marginal ridges are again distinct but not as strong as with the oval anatomy type.
  - The labial surfaces are relatively wide, without a noticeable difference in width between the mesial and the distal. The labial and proximal growth lobes are prominent.

- The square anatomy type
  - The characteristic feature of this anatomy type is the indistinct marginal ridges, which can sometimes cause a rather plain look.
  - A well-developed central marginal ridge is present, which appears quite prominent when viewed from the incisal edge.

Figures 25–31: These images show just a few of the many dento-facial varieties that can be found in nature.

Figures 28–34: Very full lips suggest long upper anteriors.—Fig. 32: The standard lip type.—Fig. 33: The shallow lip type suggests relatively short anteriors. This is also due to the small distance between the nose and the upper lip.

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