A study of the relationship of the dental midline to the facial median line

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Complete dentures must be pleasing and natural in appearance. An important consideration in arrangement of the anterior teeth is the matter of symmetry; a key factor being the establishment of the dental midline. This is the imaginary line that will separate the two maxillary central incisors. Dental authors who have addressed themselves to this matter have revealed a division of thought: school No. 1 recommends that the midline of the anterior teeth be placed precisely in the facial median line or the middle of the mouth using such landmarks as the incisal papilla and the labial frenum to establish it. Members of school No. 2 believe that the dental midline should almost never be established in the precise middle of the mouth because to do so contributes to an artificial appearance. Presumably the members of both schools believe they are following the precepts of nature. The dental literature fails to reveal the report of any research designed to provide information as to how nature does in fact arrange the natural anterior teeth in relation to the anatomic anterior median line of the face which, in this article, will be called the "facial median line."

RESEARCH DESIGN
This study was designed to answer two questions. First, does nature normally position the central incisors on either side of a line which extends vertically through the exact center of the anterior portion of the mouth? Second, does the midline of the mandibular teeth normally coincide with the maxillary midline?

Five hundred subjects with natural dentitions were examined. They were chosen randomly from patients who sought dental treatment at the University of Alabama School of Dentistry, the only requirement being that the individual possess 12 natural anterior teeth. Ages of the subjects, both men and women, ranged from 12 to 70 years. The group was comprised of 271 Caucasians and 229 non-Caucasians.

Procedure
Prior to beginning the study, the professional staff in the Oral Diagnosis Clinic were oriented so that there would be consistency in the criteria used to make the evaluations and the manner in which the data were recorded. All of the examiners were experienced generalists, each with more than 20 years of experience. As a part of the routine examination, a specially prepared form was filled out by the examiner. The form required that four questions be answered:

1. Does the dental midline (between the maxillary central incisors) coincide with the facial median line (using the philtrum as the most reliable guide)?
   Yes No

2. Does the midline of the maxillary teeth coincide with the midline of the mandibular teeth?
   Yes No

3. Is the patient Male Female

4. Is the patient Caucasian Non-Caucasian

Results of the study
As shown in Table 1, of the 500 people examined there were 352 (70.4%) in whom the midline of the maxillary dentition coincided with the median line of the philtrum (Fig. 1). When the 95% confidence limits were calculated for this percentage, they extended from 66.4% to 74.4%. In other words, the data indicate that it is very likely that the midline of the maxillary teeth and the philtrum coincide in almost 75% of the people.
Fig. 1. The maxillary midline of this dentition coincides with an imaginary vertical line extended through the philtrum. Note that the midlines of the maxillary and mandibular dentitions do not coincide. This finding was the most common combination encountered in the population sampled.

Fig. 2. The maxillary midline does not coincide with the median line of the mouth (philtrum), nor do the two midlines (maxillary and mandibular) coincide with each other.

Table II illustrates that of these 500 persons only 139 (27.8%) had the midline of the maxillary and mandibular dentitions coinciding (Figs. 2 to 4). The 95% confidence limits for this rate extended from 23.9% through 31.7%. In other words, the statistics indicate that it is quite unlikely that the two midlines match in more than 32% of the total population.

Tables III and IV show the results by sex. When the data were analyzed for the two sexes, there were 128 (68.8%) of 186 men whose philtrum coincided with the midline of the maxillary dentition. The comparable rate for the women was 224 (71.3%) of the 314 for whom the midline of the maxillary dentition coincided with the philtrum. The difference between these two rates was not statistically significant ($t = -0.597$).

Also, in 50 (26.9%) of the 186 men the two midlines matched. The two midlines coincided in 90 (28.3%) of the 314 women. The difference between these rates for the two sexes was not statistically significant, $t = -0.353$.

Tables V and VI, list the results comparing Caucasian with non-Caucasian persons. There were 202 (74.5%) of the 271 Caucasians whose midline of the maxillary teeth matched the philtrum. Among the non-Caucasians, there were 150 (65.5%) of the 229 non-Caucasians in whom the midline of the maxillary and mandibular midlines coincide with each other. Although the teeth in most artificial dentures are arranged in this fashion, this combination was seen in only a relatively small percentage of the 500 subjects examined.
ENTAL MIDLINE AND FACIAL MEDIAN

Table I. Number of subjects whose dental midlines coincided with the median line of the philtrum

<table>
<thead>
<tr>
<th>No. of subjects</th>
<th>Does coincide</th>
<th>%</th>
<th>Does not coincide</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>352</td>
<td>70.4</td>
<td>148</td>
<td>29.6</td>
</tr>
</tbody>
</table>

Note: 95% constant limits extend from 66.4% to 74.4%.

Table II. Number of subjects in whom the midline of the maxillary dentition coincided with the mandibular midline

<table>
<thead>
<tr>
<th>No. of subjects</th>
<th>Does coincide</th>
<th>%</th>
<th>Does not coincide</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>139</td>
<td>27.8</td>
<td>361</td>
<td>72.2</td>
</tr>
</tbody>
</table>

Note: 95% confidence limits extend from 23.9% through 31.7%.

Table III. Number of men as compared with women whose dental midline coincided with the median line of the philtrum

<table>
<thead>
<tr>
<th>No. of subjects</th>
<th>Does coincide</th>
<th>%</th>
<th>Does not coincide</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>186</td>
<td>68.9</td>
<td>58</td>
<td>31.1</td>
</tr>
<tr>
<td>Women</td>
<td>314</td>
<td>71.3</td>
<td>90</td>
<td>28.7</td>
</tr>
</tbody>
</table>

Note: The difference between rates for the two sexes is not statistically significant ($t = -0.597$).

maxillary teeth coincided with the philtrum. The rates in the two races were statistically significantly different at the 5% level ($t = 2.216$).

The two midlines matched in 79 (29.2%) of the 271 Caucasians. Among the non-Caucasians the two midlines matched in 60 (26.2%) of the 229 people. The difference between the two rates was not statistically significant ($t = 0.734$).

SUMMARY

This report presents the results of an original investigation designed to determine (1) the prevalence in the natural dentition of a maxillary midline located in the exact middle of the mouth using the philtrum as the most reliable guide and (2) the percentage of people in whom the maxillary and mandibular midlines precisely coincide with each other. Results indicate that the midline is situated in the exact middle of the mouth in approximately 70% of people and that the maxillary and mandibular midlines fail to coincide in almost three fourths of the population.

CONCLUSION

In an arrangement of artificial teeth the midline may be placed in the precise midsagittal plane or slightly at variance from it with no loss in natural appearance. The most reliable guide in making this decision would be the patient's natural teeth prior to extraction. When no preextraction records are available, the most prudent course would seem to be to place the maxillary midline in the exact middle of the mouth using the philtrum as a guide and to disregard whether or not the maxillary and mandibular midlines coincide.
REFERENCES


INFORMATION FOR AUTHORS

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