

# Comparison of occlusion in medieval and present-day populations in southeast France

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Two groups living in southeast France several centuries apart were compared to assess changes in occlusion from medieval times to the present day. The present-day sample included 82 people, and the medieval sample included the skulls of 58 people who lived between the 8th and the 17th centuries. Variations in tooth contacts were examined in accordance with Angle classification. A decrease in Class III occlusion (mesioclusion) was noted from medieval to present-day populations. The rate of Class II occlusion (distocclusion) has increased progressively and has become a general feature in the present-day population (34%). Although the rate of Class I occlusion has generally decreased from proto-historic and medieval times to the present day, it is still the highest percentage (45%) and thus the "normal" reference in European populations. This study highlights distocclusion in human teeth and allowed us to ask questions about functional, genetic, psychological, and environmental factors that cause this malocclusion as opposed to the global harmony that Angle described. (*Am J Orthod Dentofacial Orthop* 2001;120:585-7)

The dental records of present-day white people suggest that the occlusion of the dental arches has been changing over the last century. This study was designed to investigate the change in Angle classification that regulates contacts between teeth in the anteroposterior direction. Angle's classification<sup>1</sup> divides contacts between teeth in the sagittal plane into 3 categories: Class I, the reference position, is characterized, according to Angle, by "normal" mesiodistal contacts of the first molars; ie, the mesiobuccal cusp of the upper first molar is between the mesial and distal cusps of the lower first molar. Likewise, the lower canine is between the mesial edge of the upper canine and the distal edge of the lateral incisor. The upper incisors are labial compared with the lower ones.

Class II malocclusion is characterized by a distal occlusion (distocclusion) of the mandibular arch. In Class III malocclusion, a mesial occlusion (mesioclusion) of the mandibular arch is seen in diverse cases of mandibular prognathism. The Class II or III malocclusion is assessed with a half cusp more or less at the reference, or Class I, position. A comparison was made

between a medieval sample (8th to 17th centuries) and a present-day group living in southeast France.

## MATERIALS AND METHODS

No sex or age criteria were established because the Angle classification is not statistically related to either variable in adults.<sup>2</sup>

The skulls of 58 adults, 17 to 60 years of age, were studied. They came from 5 archaeological sites in southeast France and are presently kept in the Anthropology Laboratory at Faculté de Médecine Nord in Marseille (Ref No UMR6569). The 58 skulls came from graves used between the 8th and 17th centuries at La Gayole (9), Ganagobie (4), Fréjus (9), Olbia Saint-Pierre (5), and Digne (31). These people lived in the country or belonged to religious orders, and only their craniums were studied. Each skull had permanent dentition with enough postmortem teeth (canines and first molars) to establish a correct, and easily reproduced, occlusion. Each cranium was stabilized along the Frankfort plane in a sand container, and the best possible hinge was found according to the wear facets recorded in the occlusal tables drafted from each subject's tooth pattern.

The present-day sample included 82 men, 19 to 25 years of age, from a firefighting unit (UI5C7) in Brigolles. None of them had received orthodontic treatment, and all had complete dentition. The Angle classification categories were recorded in maximum intercuspal position.

In both groups, tooth contacts were used to confirm

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**Table.** Distribution of Angle classification in medieval and present-day populations in southeast France

Population	Class I		Class II		Class III		Total	
	Number	%	Number	%	Number	%	Number	%
Medieval	25	43.1	11	18.9	22	38	58	100
Present-day	37	45	28	34	17	21	82	100

or invalidate a molar position that had already been assessed and to standardize measurements between the groups.

## RESULTS

In the medieval population, the incidence of Class III malocclusions was high (38%), but few had a Class II malocclusion (18.9%). In the present-day population, Class I was predominant, Class II was high, and Class III was lowest (Table). The chi-square test confirmed significant differences among the 3 categories ( $P = .0398$ ). This did not apply to Class I alone, so the reversal of frequencies from Class II and Class III explained the difference between both populations.

## DISCUSSION

Comparing 2 groups that lived at least 500 years apart in southeast France confirms that the "normal" reference is still the Class I occlusion. Class II malocclusion is increasing at the expense of Class III, which has become less frequent (21%). Thus, Class III mesio-closures have apparently regressed in time. Contrarily, the high percentage of Class II distoclosures in the present-day population (34%) suggests that this definitely is an evolving phenomenon. Our results match those of Benauwt<sup>3</sup> for 52 Gallic and Gallo-Roman skulls (Class I, 57%; Class II, 13.4%; Class III, 28.8%). Over 50 years ago, Siepel<sup>4</sup> established the following standard with a group of 137 Swedes (Class I, 74.15%; Class II, 20.10%; Class III, 5.75%). These data demonstrate a malocclusion reversal from Class III to II in present-day people, and this study also highlights the increasing incidence of distoclosures compared with Class I "normal" occlusions. In addition, Slavicek et al<sup>5</sup> showed the same change in a white population of 2235 persons in 1983, with a parallel (and even more significant) increase to 52% in skeletal Class II. These findings should raise questions about the origin of this occlusion modification in man. Several reasons are cited in the literature. Begg,<sup>6</sup> since 1954, has described the evolution of Class III according to interproximal wear by studying Australian Aborigines. Brace and Loring<sup>7</sup> attribute the reduction in the biomechanical forces of chewing and less attrition of teeth to the appearance of refined

flours and the fork in the 17th century. This agrees with a functionalist vision of evolution.

Likewise, the environmental and social factors inherent in a modern, stressful lifestyle and the lack of parent-child bonding may generate harmful habits. This is exemplified by thumb sucking at a late stage, which may affect the development of the dental arches and the occlusion in children.<sup>8</sup> Van der Linden<sup>9</sup> and Corruccini<sup>10</sup> also studied the influence of the environment. The "leptomorph" evolution of the present day creates the appearance of a more posterior mandible by reducing the dimensions of the palate with a smaller respiration.<sup>11</sup>

On the other hand, because this imbalance includes genetic and ontogenetic aspects of evolution<sup>12</sup> characterized by our physical posture and current physiological development,<sup>13,14</sup> it cannot be denied.

## CONCLUSIONS

This study helped to place Angle classification in the dynamic perspective of human history. The significant emergence of Class II and the related distocclusion in European populations should raise questions about the evolution of the human race. However, the results of this study should be confirmed with further investigations on white and other ethnic populations.

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