Short Communication

Display of Mandibular and Maxillary Anterior Teeth During Smiling and Speech: Age and Sex Correlations

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This study aimed to measure mandibular and maxillary anterior tooth display during smiling and speech and to evaluate correlation with age and sex. Ninety-four subjects were video recorded when smiling and when saying "ah" or "shesh." Anterior tooth display was measured using individual video frames. Average mandibular and maxillary anterior tooth display showed opposing trends. The former increased with age, had a tendency to be greater in men, and was greater during speech than during smiling. The latter decreased with age, was greater in women than in men, and was greater during smiling than during speech. Anterior dental esthetic evaluation, especially for the mandible, should include observation of speech. *Int J Prosthodont 2008;21:149–151.*

Anterior tooth display is dependent on smiling, speaking, age, and sex.[1–3] The purpose of this study was to use a digital video technique[4] to measure display of mandibular and maxillary anterior teeth during smiling and 2 representative speech expressions and to evaluate correlation with age and sex.

Materials and Methods

Ninety-four people were examined from the Israeli population at large. Ninety-one of these subjects had unrestored mandibular and maxillary anterior teeth, and 3 had one or more crowned maxillary anterior teeth. Informed consent was obtained to use video recording of lips and teeth for dental research.

Each person was recorded with a digital camera using the macro and video mode (Nikon Coolpix 5200, Nikon).[4,5] While holding a ruler in a vertical position so that its millimeter markings were clearly visible on the left vertical border of the frame, the subject pronounced "ah" 3 times, closing the mouth and resting between each sound. This common speech sound, where the lips are relaxed, acted as a control. The syllable "shesh" was then pronounced 3 times. "Shesh" (meaning "six" in Hebrew) has been observed to clearly reveal the mandibular anterior teeth. Finally, a smile was evoked.

Analysis

The movie files were played back in slow motion, and individual frames were captured using a previously described method.[4] For the "ah" sound, 3 frames showing the lips and teeth at peak opening were selected. For "shesh," frames were captured at the moment when the vowel is pronounced after the first "sh" sound. Between 1 and 3 frames of the smile were saved, depending on whether the smile changed while being recorded. Each image was inserted into a separate slide of presentation software (PowerPoint 2003, Microsoft). Measurements of anterior tooth display were made with a virtual 10-mm ruler constructed with the presentation software drawing tools. The ruler was calibrated for each video frame by expansion or compression until its outer lines corresponded to 2 consecutive 1-cm marks on the photographed ruler also seen in the frame (Fig 1). Averages were calculated for each subject. For each expression, Student *t* tests were used to evaluate differences between men (n = 48) and women (n = 46) and between age groups: Group 1 = 10 to 30 years (n = 34, mean age: 21.06 ± 3.45 years); group 2 = 30 to 50 years (n = 30, mean age: 41.23 ± 4.84 years); and group 3 = 50 to 70 years (n = 30, mean age: 58.97 ± 5.44 years). $P < .05$ was considered statistically significant.

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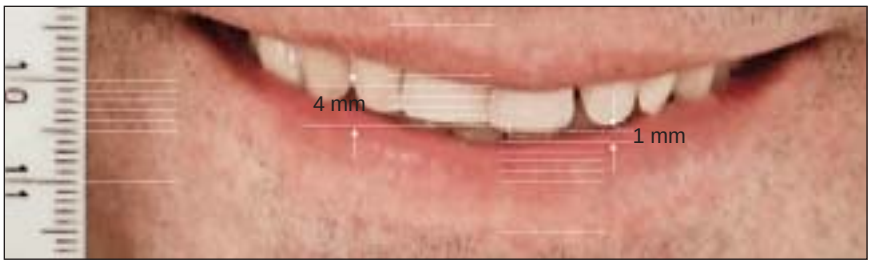

Fig 1a Video frame (640 × 480 pixels) of a smile with 1 mm of mandibular anterior tooth display and 4 mm of maxillary anterior tooth display.

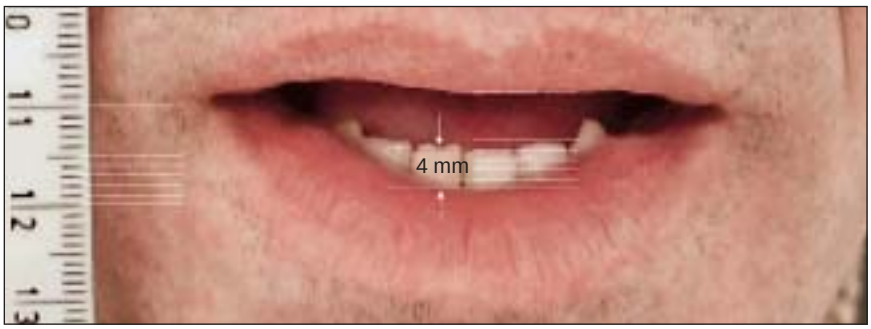

Fig 1b Video frame (640 × 480 pixels) of "ah" expression with 4 mm of mandibular anterior tooth display and no maxillary anterior tooth display.

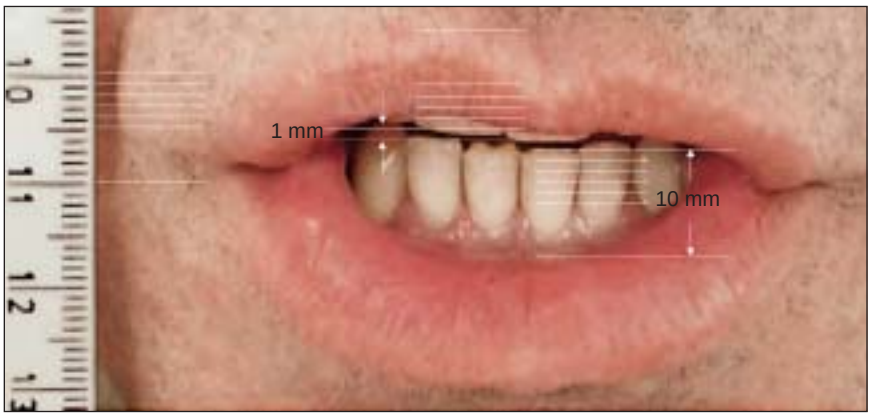

Fig 1c Video frame (640 × 480 pixels) of "shesh" expression with 10 mm of mandibular anterior tooth display and 1 mm of maxillary anterior tooth display.

Results

All groups showed large standard deviations. However, on average, increase in age was associated with a highly significant decrease in maxillary anterior tooth display (Fig 2). Between the age of 20 and 60 years, this decrease amounted to about 3 mm. In contrast, average mandibular anterior tooth display increased significantly with age for the 2 speech expressions, amounting to an addition of about 1.5 mm between the youngest and oldest groups. For the smile, however, mandibular anterior tooth display did not change with age. Women had significantly greater average maxillary tooth display than men for all 3 expressions (Fig 3). In contrast, men tended to show more of the mandibular anterior teeth than women for all expressions, although this was not statistically significant.

Conclusions

The results show that speech may reveal mandibular anterior teeth to a significant extent. It is proposed that the conventional definition of the esthetic zone, ie, the zone visible in a wide smile, be expanded to include observation of the patient during speech. A decrease in maxillary anterior tooth display and an increase in mandibular anterior tooth display in older patients, especially men, should be taken into account. Speech can be conveniently examined using the video function of a nonprofessional digital camera.

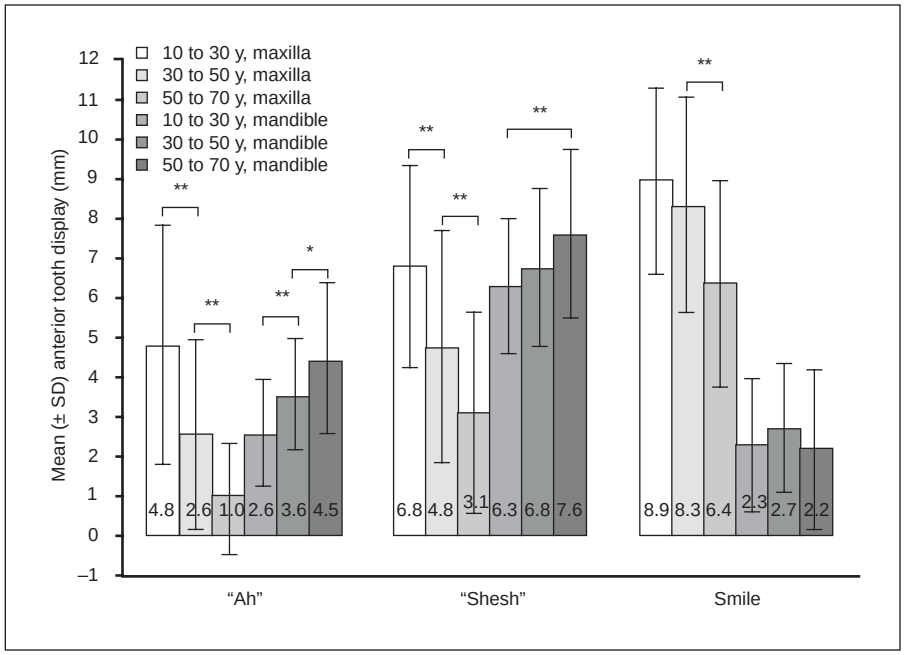

Fig 2 Display of maxillary and mandibular anterior teeth during smiling, saying "ah," and saying "shesh" for the 3 age groups. *P < .05, **P < .01.

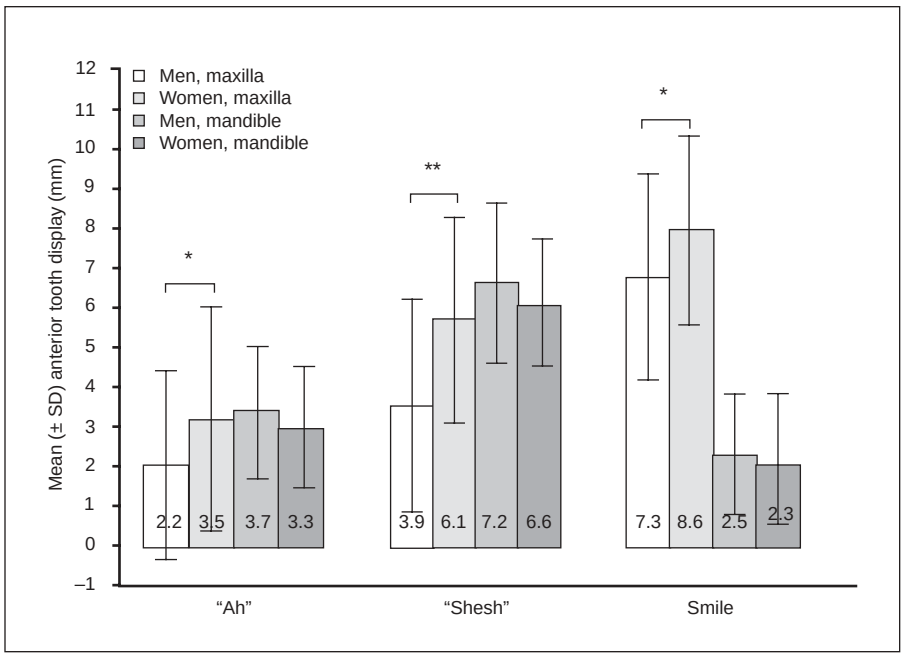

Fig 3 Display of maxillary and mandibular anterior teeth during smiling, saying "ah," and saying "shesh" for men (n = 48) and women (n = 46). *P < .05, **P < .01.

References

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