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Clinical application of early diagnosis of maxillary incisor root resorption due to eruption disturbances of canines

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The number of adolescents aged 12-19 years with dental crowding increased from 40% to 44% according to the Surveys of Dental Diseases conducted by the Japanese Ministry of Health, Labor and Welfare in 2005 and 2011. Results of anthropological studies on evolutionary changes in jawbone and tooth sizes suggest increases in the prevalence of crowing in younger Japanese generations due to jawbone size decrease and crown width increase. From these reports, the number of cases with maxillary incisor root resorption due to eruption disturbances of canines is expected to increase in the future.

The prevalence of maxillary canine eruption disturbances in the general population has been reported to be 0.8-2.9% (Kurol et al, 1995). Maxillary canines are the most commonly affected teeth, second only to maxillary central incisors, accounting for 15% of all affected permanent teeth except for wisdom teeth (Noda et al, 2006).

This presentation will introduce a numerical analysis using panoramic radiographs we devised to estimate the risk of maxillary incisor root resorption due to unilateral canine eruption disturbance. Briefly, the side with maxillary incisor root resorption caused by the permanent canine is defined as the affected side, and the non-affected contralateral side as the healthy side. Following one angular and two linear measurements on each side, 3 numerical values indicating the risk of incisor root resorption are calculated by dividing the measurements on the affected side by those on the healthy side to minimize the effects of head posture during acquisition of panoramic radiographs in different clinics.

A study was conducted to evaluate the effectiveness of this numerical analysis using panoramic radiographs of 103 cases (37 male, 66 female, age 8y3m-26y7m) with unilateral maxillary incisor root resporption caused by the canine, collected from 19 members of the Japanese Association of Orthodontists. Patient chronological and Hellman's dental age information was added for the study. Of the 103 cases, 88 (85.4%) met all the 3 numerical risk criteria. The study also revealed that the incidence of maxillary incisor root resorption due to the canine started to increase sharply at age 10 years or III B.

The results of this study suggest the need to take a panoramic radiograph by age 8 years or Hellman's dental age III A for risk screening to prevent maxillary incisor root resorption due to eruption disturbances of canines. This would encourage clinicians to propose solutions to patients at risk for incisor root resorption identified by this method.