

## **Prevalence and Seasonality of Cleft Births: An Analysis of Birth Data from an Oregon Hospital**

Rachel A. Hoffman, DDS, MS (2017)

**Introduction:** Orofacial clefting is one of the most common congenital deformities affecting newborns. The presence of a cleft not only modifies the appearance of the face, but can take a toll on the affected individual emotionally and psychologically as well. Many studies have been conducted which evaluate the prevalence and seasonality of cleft births, but to date, none of these have looked at data from the state of Oregon. The primary objective of this study was to establish the overall birth prevalence of children born with clefts at an Oregon hospital, and secondarily to evaluate whether children with clefts exhibit an increased birth rate during certain months or seasons throughout the year (birth seasonality). The null hypotheses of this study was that the prevalence of cleft births at Oregon Health & Science University Doernbecher Children's Hospital does not differ from nationally and internationally reported rates, and that there is no significant seasonal difference when the births of children with clefts are compared to children born without clefts.

**Materials & Methods:** Data including gender, race and ethnicity, birthdate, and diagnosis of a cleft was gathered from a total of 21,056 infants (107 cleft/20,949 non-cleft) born at Oregon Health & Science University Doernbecher Children's Hospital, Portland, Oregon (OHSU DCH) from January 2009 through August 2017. The data were used to establish the overall prevalence of cleft births at OHSU DCH over the study period, and to evaluate whether more children with clefts are born during certain months or seasons when compared to children who are born without a cleft. The prevalence of clefts diagnosed at the time of birth in the OHSU DCH population was compared with prevalence values from the United States and worldwide using two-tailed proportion tests. Chi-square tests were used to evaluate the frequency birth distributions between the months and seasons for the study population. A p-value of <0.05 was considered as statistically significant.

**Results:** The overall prevalence of children born with clefts at OHSU DCH was 5.08 per 1000 births or 1 in about 197 births. OHSU DCH had a significantly higher cleft birth prevalence compared to national and international cleft prevalence reports of 1 in about 690 births and 1 in about 700 births, respectively. A greater number of cleft births occurred during the summer season, with the month of September showing the greatest number of cleft births over the years evaluated. However, season and month of the year were not significantly associated with cleft birth prevalence.

**Conclusions:** The overall prevalence of cleft births at OHSU DCH was significantly higher than nationally and internationally reported prevalence values. The results of this study suggest that there is no apparent seasonality associated with cleft births, and that children born with clefts follow the same seasonal birth trends as children born without clefts.

## **A retrospective study of the incidence of apical root resorption for the four maxillary incisors in adolescent and adult patients that received clear aligner orthodontic treatment for nine months or more**

Kari Harnick, DDS, MS (2017)

**Background:** Orthodontically induced root resorption (OIRR) is described as the permanent loss of cementum and dentin seen as root blunting and shortening of the apex on a 2-dimensional radiograph. The maxillary incisors are the most commonly affected teeth in the dentition. The aim of this study was to evaluate the incidence of root resorption of the four maxillary incisors in adolescent and adult patients who underwent Invisalign therapy with the SmartTrack material for nine months or more.

**Materials and Methods:** The study group consisted of 186 consecutive patients treated by one board certified orthodontist from January 2013-December 2016. Patients included were healthy adolescents and adults who underwent clear aligner therapy for at least nine months with no premolar extractions and who had pre-treatment and post-treatment or progress pantomographs using the same machine. Patients were excluded if there were existing signs of root resorption, endodontically treated teeth, severe dilacerations or they presented with tooth wear at the initial exam. Measurements for the four maxillary incisors were calculated by using the Linge and Linge formula  $[R2 \times C1 \times 100] / [R1 \times C2] = \% \text{ root resorption}$  to calculate the relative crown to root ratio. Patients were evaluated by age, gender, Angle Classification, amount of maxillary crowding, overbite, overjet and length of treatment.

**Results:** Overall, 4.86% of patients showed no apical root resorption of any of the four maxillary incisors while 38.38% of patients showed some resorption on all four maxillary incisors. The majority of teeth, 67.5%, experienced a resorption rate of less than 10% of total root shortening. Only 2 teeth showed more than 20% reduction in root length with no single tooth experiencing more than 25% reduction. Age, gender, length of treatment, Angle classification, amount of maxillary crowding, overbite or overjet had no significant effect on apical root resorption of the four maxillary incisors.

**Conclusions:** Within the limitations of this retrospective study, Invisalign with SmartTrack aligners appeared to induce minimal clinically significant apical root resorption regardless of age, gender, Angle classification, treatment duration, amount of maxillary crowding, overbite or overjet.

## **Retrospective outcome assessment of Invisalign Teen and fixed edgewise orthodontic treatment in a teenage population using the American Board of Orthodontics objective grading scale**

Alissa F. Bora, DMD, MPH, MS (2017)

**Introduction:** In 1997 Align Technology (Santa Clara, Calif.) began to market a new clear aligner appliance for orthodontic treatment known as Invisalign. Several studies have been published that quantify the treatment outcome difference in patients treated with fixed orthodontic appliances (FOA) and those with clear aligner therapy (CAT). Generalized results show greater efficacy with FOA, and mixed results with regards to efficiency regardless of technique. Current literature demonstrates a lack of clinical research with CAT applied to teenagers. This study seeks to compare the efficacy and efficiency of Invisalign compared to FOA in a teenage population.

**Materials and Methods:** A retrospective analysis was conducted using 52 digital treatment records: 26 patients treated with Invisalign and 26 treated with FOA who were selected from consecutively treated patients until there were 30 patients in each group which met the inclusion criteria (non-syndromic, non-extraction, no prior orthodontic treatment, no missing teeth, no impacted teeth needing surgical exposure, and no cases debonded prior to treatment being finished due to poor compliance and/or poor oral hygiene). Four patients were excluded from each group after the discrepancy index (DI) score was calculated. All patients were treated by the same orthodontist over the same period of time. Initial and final records were used for the assessment of the American Board of Orthodontics (ABO) discrepancy index (DI) and the ABO objective grading scale (OGS). Scoring of each case was completed by one blinded reviewer using OrthoCAD (Cadent, Fairview, NJ) digital software ABO DI and OGS measuring tools. Data were analyzed using Pearson's correlation, Wilcoxon rank tests, unpaired t-tests, and Chisquare tests.  $P < 0.05$  was used to determine statistically significant differences.

**Results:** The mean DI score was  $11.85 \pm 5.33$  for Invisalign patients and  $11.58 \pm 4.74$  for FOA patients. No significant differences were found between the two groups for any of the individual DI categories. The mean OGS score for the Invisalign group was significantly lower ( $30.08 \pm 8.30$ ) compared to the FOA group ( $36.96 \pm 9.34$ ). Treatment time using Invisalign ( $16.92 \pm 5.66$  months) was significantly shorter compared to the treatment time using FOA ( $23.35 \pm 4.41$  months). Invisalign patients had significantly fewer scheduled appointments ( $13.69 \pm 4.36$ ) and fewer emergency visits ( $0.81 \pm 0.98$ ) compared to the FOA group. The Invisalign group had 12 of 26 patients (46%) with an OGS score of 29 or lower compared to 6 of 26 patients (23%) for the FOA group. This difference was not statistically significant.

**Conclusions:** The ABO OGS scores for the Invisalign group suggest that teenagers with mild to moderate malocclusions can be treated effectively and efficiently with the Invisalign appliance while also achieving acceptable treatment outcomes. However, comparisons between cohorts should be interpreted cautiously. Using the DI as a baseline for comparing groups does not adequately distinguish between the levels of difficulty for treating a malocclusion. Furthermore, the ABO OGS does not assess whether the treatment outcome with regard to the facial growth pattern and patient cooperation was similar for both groups. The current findings could be used as baseline data for a prospective randomized clinical trial.