Mucosal Thickening of Maxillary Sinuses of CLP vs non-CLP patients.
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Objectives: The objective of this retrospective radiographic study was to compare mucosal
thickening of maxillary sinuses of patients with cleft lip and palate (CLP) vs. non-CLP.
Methods: Following IRB approval, three-dimensional cone beam computerized tomographs
(CBCT; i-CAT) of children with unilateral CLP and children without CLP (age and gender
matched; 8-14yoa; n=15ea) were selected randomly from pre-existing orthodontic records.
Following reliability studies, one investigator segmented both sinuses from each CBCT using
Dolphin-3D Imaging software. The sinuses were separated coronally into .4mm slices antero-
posteriorly. Bony sinuses and airspaces were outlined manually on each slice. Software
calculated total sinus and airspace area. Areas were summed and multiplied by slice thickness to
determine volume. Mucosal thickening was the difference between total sinus and airspace
volumes. Percent mucosal thickening was calculated. Since no significant differences existed
between cleft (left) and noncleft (right) sides of either patient group (p>.05), sinuses for each
group were pooled (n=30 ea). Significant differences in total sinus, airspace, mucosal thickening
volumes and % mucosal thickening were determined using paired t-tests, accepting p≤0.05 as
significant. Principal Component Analysis (PCA) scatterplots were used to determine patterns of
multivariate variation based on group, age, and sex. MANOVA was used to confirm PCA
findings. Reliability was determined using Intraelass Correlations (ICC).
Results: Reliability was excellent (ICC>0.99). The CLP total sinus and airspace volume were
significantly smaller and mucosal thickening and % mucosal thickening were significantly
greater than non-CLP sinuses (all p≤.024). PCA showed that 89.6% of sample variance was
explained by PC axis 1 and 2 (group and age). Age group 8-9yrs showed more separation with
13-14yrs than with 10-12yrs. MANOVA confirmed a significant effect of sample (p=.001) and
age (p=.007).
Conclusions: Children with unilateral CLP should be examined for potential problems related
to sinus mucosal thickening.
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