

Type and frequency of malocclusions in a German population of isolated non-syndromic cleft patients

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Introduction

Orofacial clefts (CLP) are among the most common congenital malformations of the orofacial system with a prevalence of approximately 1:500 live births¹. These malformations are often associated with malocclusion and abnormalities in tooth formation, eruption, position, and tooth number². The nature and frequency of malposition are of great interest with regard to orthodontic treatment planning and rehabilitation of these patients.

The aim of the present study was a retrospective analysis and three-dimensional evaluation of the nature and frequency of occlusal and dental malposition and their association with the cleft type.

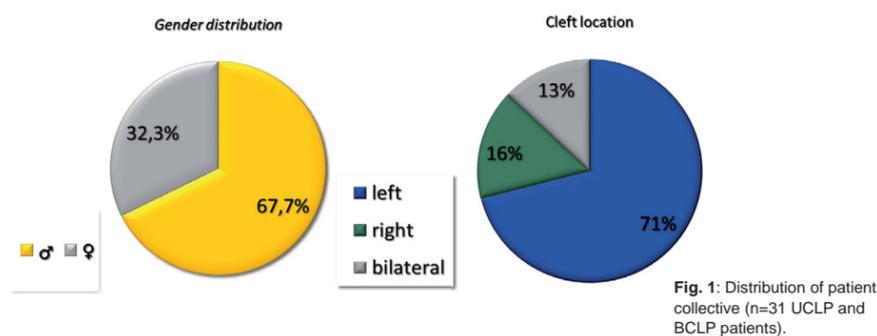
Material und Methods

A total of n = 58 cleft patients, born in between 1982-2010, who had been treated in the Department of Orthodontics, Medical Faculty Carl Gustav Carus, TU Dresden, were systematically evaluated.

31 met the inclusion criteria:

- non-syndromic unilateral (UCLP) or bilateral (BCLP) orofacial cleft
- Mixed or permanent dentition
- sufficient documentation
- Intact initial plaster cast

Subsequently, the models were recorded using a 3D scanner (OrthoXScan, Dentaurum, Ispringen, Fig. 1) and the 3D model scans were measured three-dimensionally (CleftDynamic, S.K.M. Informatik GmbH, Schwerin). With regard to the cleft localization, the type and frequency of tooth malocclusions and any differences in tooth position anomalies between the cleft side and the non-cleft side were statistically evaluated ($p \leq 0.05$).



Results

Analysis included 22 unilateral left-sided clefts, 5 unilateral right-sided clefts and 4 bilateral cleft malformations. The gender distribution showed a ratio of 2.1:1 male to female patients (Fig.: 1). In the following analysis, only the unilateral clefts were considered.

In UCLP patients, tooth position anomalies in form of angulation (tip) and inclination (torque) malposition as well as distal position of the teeth 11 and 21 could be found. The cleft localization had a significant influence on tip and torque of 11 and 21. Incisors on the cleft side frequently showed significant smaller values for tip (disto-angulation) and torque (palatal-inclination) (Fig.: 2a), which could be detected in both left and right-sided clefts and total comparison as well.

In addition, on the cleft side there was a significant reduced overbite and overjet in the area of the central incisors (tendency towards an open bite and class III malocclusion, Fig.: 2b), which was significant in left-sided clefts and in total comparison for both measurements. Moreover, in the area of the first permanent molars a cross bite could be found, which was also significantly more frequent on the cleft compared to the non-cleft side (Fig.: 2c). This significance could only be found in total comparison, but not for left- or right-sided clefts in particular. Furthermore, the distance of the upper central incisors to the tuber plane (disttuber - sagittal position of the incisors) was significantly smaller on the cleft side compared to the non-cleft side (distal/palatal position of 11, 21; Fig. 2d). This significance was found for left-sided clefts and in total, but not for right-sided clefts.

Conclusion

Abnormalities of the upper central incisors most frequently occur in cleft patients and are strongly correlated to the cleft side, but a cross bite in the region of the first permanent molar can also be frequently found compared to the non-cleft side. This should be taken into account concerning orthodontic treatment planning in these patients.

For references please contact author

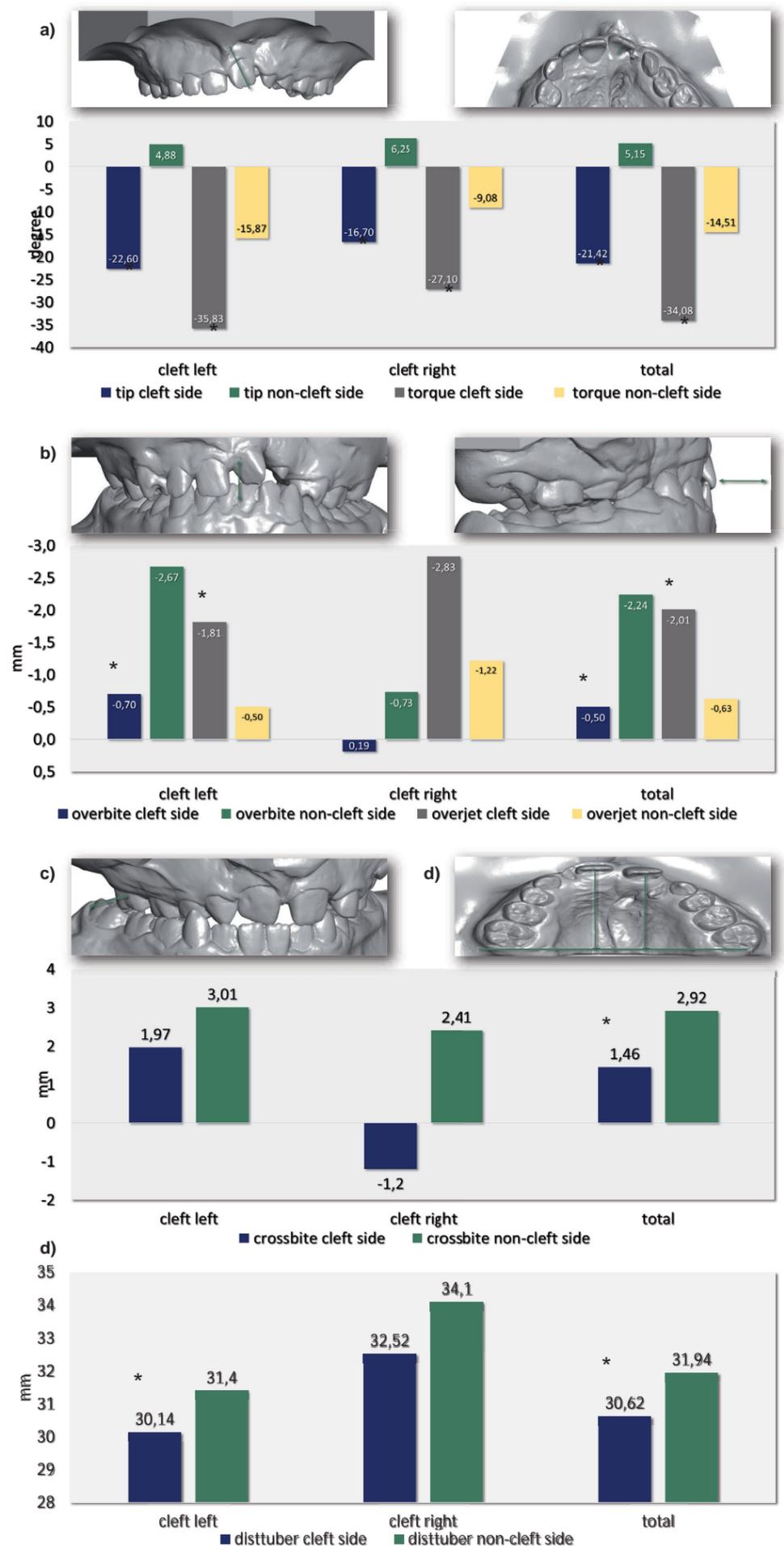


Fig. 2: Median values of 3 single measurements at digital model cast of UCLP patients a) Tip and Torque measurements of tooth 11, 21 (n=25 model casts) in degree b) overjet (n=20 model casts) and overbite (n=18 model casts) measurements in mm c) cross bite (n=25 model casts) measurements in mm d) distTuber (n=25 model casts) measurements in mm, respectively. SPSS Statistics 27.0 (IBM Deutschland GmbH, Ehningen, Germany), * $p \leq 0.05$; cleft vs. non-cleft side.

The authors declare no conflict of interests.