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Title Page

Title: Aesthetic and psychosocial impact of dentofacial appearance after primary rhinoplasty for cleft lip and palate

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Abstract:

Aims: The primary aim of this study was to demonstrate whether primary rhinoplasty shows aesthetic and psychosocial advantages for children with a complete unilateral cleft lip and palate.

The second aim was to determine the satisfaction levels concerning the dentofacial appearance.

Material and methods: Group A corresponded to patients from a centre specialised in primary cheilo-rhinoplasty with 20 years' experience and Group B to patients who did not benefit from primary rhinoplasty.

Children and their parents filled in a custom-designed satisfaction questionnaire on dentofacial appearance and its psychosocial impact. The variables studied were the main criterion (the nose) and secondary criteria (the upper lip, the smile, the profile and the face as a whole).

Results:

56 families consented to be involved in the study. The children did not rate statistically differently their social relationships if they had primary rhinoplasty or not. Parents however expressed very different views. They considered the nasal appearance of the children who had primary rhinoplasty as statistically more attractive and evaluated their psychosocial experience as significantly better. For the other parts of the face, in both groups, satisfaction levels of dentofacial appearance and psychosocial comfort were good (scores above 80/100). Yet, 44% of the families would go for further interventions, especially concerning

the nose (13% of whom were in Group A and 42% in Group B).

Conclusions: Within the limitations of this study, primary rhinoplasty seems to improve the patient's well-being and social life.

Keywords: Cleft lip, Cleft Palate, Rhinoplasty, Dentofacial deformities, Smiling, Psychosocial Deprivation

Introduction

The symmetry of a face is fundamental to the constitution of the human being, and from this viewpoint, the existence of a scar or the asymmetry of a lip and nose resulting from cleft lip and palate can trigger great distress in human relationships. For the most severe forms, there can be an obvious, visible disproportion between the different features. In the course of life at school, spontaneous and outspoken remarks from classmates can lastingly distress a child in this situation. In 1997, Kapp-Simon and MacGuire showed that some adolescents were socially inhibited and had more difficulty taking part in leisure activities, such as sports club activities. Many studies have shown lower self-esteem whatever the patient's age (Lockhart, 2003; Slifer et al., 2003; Millar et al., 2013; Gkantidis et al., 2013; Naros et al., 2018). This can be measured very early on in primary school among children aged between 5 and 6 (Kramer et al. 2008) and can ultimately lead to social isolation (Pope and Ward, 1997).

To date, no consensus concerning the primary surgery protocol has been found across the different cleft lip and palate (CLP) centres (Eurocleft, Shaw et al. 2011). Opinions diverge regarding the techniques, the number of surgical interventions or the best age for surgical corrections. Nose surgery for instance is a subject of controversy. The growth of the nose remains particularly active after adolescence, so it has been thought that rhinoplasty should be performed in adulthood so as not to risk altering the nose (van der Heijden et al. 2008).

However, in recent years, many studies have shown that primary rhinoplasty does not have an impact on growth (Smahel et al. 1999, Kim et al. 2004, Gupta et al.2017, Attia et al., 2019) and more and more centres have opted for early nose surgery at the same time as cheiloplasty.

This is called primary cheilo-septo-rhinoplasty, performed in the first year of a child's life. This

therapeutic option is motivated by aesthetic and functional objectives but underpins a deeper ambition: to improve the patients' well-being from a very early age. No study however seems to have validated this argument (Talmant et al. 2017).

The main objective of this study was to determine whether primary rhinoplasty provided real aesthetic and psychosocial benefits for children with complete unilateral CLP. The secondary objective was to collect descriptive data regarding satisfaction concerning each part of the face affected by the cleft, whatever the primary surgery protocol they had received.

Material and Methods

1. Population

This multicentre study assessed patients from three French specialist centres. Group A corresponded to patients from a centre specialised in primary cheilo-rhinoplasty with 20 years' experience, the most long-standing in France (Fig. 1). Group B was made up of patients from the other two cleft competence centres, where rhinoplasty is only performed at the end of a child's growth. For all centres, primary surgical interventions are carried out by one and the same surgeon within each center, with cheiloplasty, veloplasty and closure of the hard palate in the first 18 months of a child's life. Patients of group A underwent primary cheilo-rhino-septoplasty at the age of 6 months (Millard closure for the lip modified by Talmant (Talmant *et al.* 2016), rhino-septoplasty using Talmant technique (Fig.2 and 3) with a large liberation and replacement of upper and lower lateral cartilages, large subperiosteal dissection, septoplasty and nasal retainers) together with Sommerlad intravelar veloplasty. The hard palate was closed at 16

months. In group B, 2 centers were involved. Lip closure was performed at 5 months using Millard technique in both centers. Soft palate was closed using Sommerlad intravelar-veloplasty. For one center soft and hard palate were closed in 2 stages (soft palate at the same time of cheiloplasty and hard palate at 10 months). For the other center of group B, the hard and soft palate were closed in one stage using Veau-Wardill flaps at 8 months. Early secondary alveolar bone grafting contributing to improving the labial-nasal projection is performed in all three centres (Witsenberg, 1985) when children still have their deciduous teeth, around 5 years of age. The same follow-up of children was performed in both groups, with regular multidisciplinary consultation (surgeon, orthodontist, speech therapist and E.N.T.). None of the centers benefit from the support of a psychologist.

The inclusion criteria concerned pre-adolescents aged between 8 and 14 with non-syndromic, total unilateral cleft lip and palate. Patients not in this age range, patients with isolated cleft lip or palate, those with a bilateral cleft and those with a syndrome, associated malformation, psychological disorder, or a mental delay making them unable to read and/or understand a questionnaire, were not included. Each family was informed orally and in writing of the conditions and the objectives of the study. The study was carried out in accordance with the code of Ethics of the World Medical Association (Declaration of Helsinki). It was approved by the ethical committee of the authors university hospital (Ref CE-2020-165). Informed consent was collected from the parents.

2. Methods

A satisfaction questionnaire on dentofacial appearance was developed for children and

their parents. Its content was inspired by a published survey on aesthetic perceptions (Van Lierde *et al.* 2012). The explored subjects concerned all the areas of the face affected by the cleft, with the nose as the principal criterion, and the face, the upper lip, the smile and the profile as secondary criteria. To each of these 5 criteria were associated 2 questions, one on purely aesthetic satisfaction and the other on the psychosocial impact (Fig.1, Suppl data). One part of the questionnaire was intended for the parents while the other was for the children (the questions were simpler to understand) (Fig.4).

Under each question was a 100-mm non-graduated visual analogue scale. For example, the more inharmonious the nose was perceived to be, the closer the mark was to the left end of the scale (approaching 0). Conversely, the more harmonious the nose was deemed, the closer the mark was to the right end of the scale (approaching 100). One investigator carried out the scoring manually on the scale from 0 to 100. A pre-test was devised to validate comprehension and ensure the questions were well sequenced. It was tested on 6 adults (4 women and 2 men) with a mean age of 36.5 and on 9 children (7 girls and 2 boys) with a mean age of 10.5, and no difficulties were found.

For questions concerning the nose, responses of Group A (children who benefited from primary rhinoplasty) were compared to the ones of Group B (children who benefited from lip repair without primary rhinoplasty). Thus, in this first part of the analysis, Group B is considered as a control group.

For questions about the other parts of the face affected by the cleft, i.e. the upper lip, the smile, the profile and the face as a whole, the authors did not intend to compare the 2 groups but describe the satisfaction pattern among these areas, whatever the primary surgical protocol the

children had received.

Further to the questionnaires, one more question was asked about their wishes concerning a further intervention, and if so, what it would be.

3. Statistical analysis

The statistical analysis included a descriptive part and inferential part.

The descriptive statistical analysis of quantitative variables provided each variable with position indicators (mean, median, minimum, maximum, standard deviation). A description of the qualitative variables provided the numbers and proportions for each item in the sample.

The inferential analysis was conducted according to the Bayesian statistic (van de Shoot *et al.* 2017). For the criteria concerning aesthetic appreciation of the different parts and the assessment of the psychosocial experience of children and parents, Bayesian median comparisons were conducted. R software (Version 3.2.2) and OpenBugs (Version 3.2.3) were used. The Bayesian statistic does not consider results in “statistically” or “non-statistically significant” mode, but gives a “percentage of likelihood” of obtaining such or such a result. It is the investigator's role to determine the threshold for statistical significance. In the present study, the statistical significance was fixed at 95%. Thus, in case of a result exceeding 95%, we refer to “statistically significant result”.

Results

1. Population characteristics

Among the 92 families who were contacted, 56 responded. The rates of participation in Group A undergoing primary rhinoplasty and in Group B who had no nose operation were comparable (Fig. 5).

The general characteristics of the two groups of children (A and B) were similar for age and gender. There were more children in Group B than in Group A (Table 1).

2. Satisfaction with the appearance of the nose and psychosocial repercussions

Children who underwent rhinoplasty (A) were more satisfied with the appearance of their nose than children who did not have the operation (B), but this was not statistically significant. The median scores attributed to groups A and B were 90 and 73 (over 100) respectively among the children. However, the parents of the children who benefited from primary rhinoplasty (Group A) were more satisfied with the appearance of their children's nose than the ones of Group B, with respectively median scores of 86 and 69 (over 100) among the adults. Psychosocial disturbances induced by the cleft on the nose area were comparable between operated and non-operated children. However, the parents' feelings about the psychosocial experience relating to the child's nose were better in the operated group, this result being statistically significant (Table 2). Gender did not appear to significantly influence the results.

3. Satisfaction with dentofacial appearance and psychosocial repercussions

The variables studied were the main criterion (the nose) and secondary criteria (the upper lip, the smile, the profile and the face as a whole). For all these criteria, groups A and B were combined. The objective was not to compare the specialist centres one to another, but to obtain an overview and establish a classification of the different facial zones in the preoccupations of patients and their families. Concerning satisfaction with dentofacial appearance, the median scores attributed by the children and the parents were high for all variables, situated between 80 and 92 (over 100) (Fig.6). With regard to psychosocial repercussions concerning dentofacial appearance, the median scores were also high, between 86 and 95 over 100 (Fig.4). Gender did not seem to have an impact on the children's aesthetic satisfaction or on psychosocial repercussions (Fig. 7).

4. Desire for further intervention

To the question "Would your child like to undergo further interventions?" to which parents and children were to respond together, 44.2% of the families gave a positive answer.

To the question "if so, which part(s) of the face?", the nose was often mentioned. Thus, 30.3% of the participants wanted a further surgical intervention on the nose, 13% of whom were in Group A and 42.4% in Group B. The other areas of the face yielded lower percentages (Table 3).

Discussion

Cleft lip and palate that does not affect any vital functions nonetheless touches on the very essence of a person's identity, i.e. their face, and this is true from infancy. The scientific literature has reported that the nose is one of the first preoccupations among patients with CLP (Hunt *et al.* 2005; Rosenboom *et al.*; 2014; Albers *et al.*, 2016; Feragen *et al.* 2017). The present study is original, because it set out to evaluate for the first time the psychological and social benefits of a primary rhinoplasty intervention, alongside the potential functional and aesthetic advantages already demonstrated by other authors (Smahel *et al.* 1999). Concerning the aesthetic and psychosocial impact of the appearance of nose, if we consider that the threshold of acceptability is 50, both the children and their parents accepted the appearance of the nose without identifying any major negative psychosocial impact. The results for aesthetic satisfaction and psychosocial disturbance concerning the nose were relatively high, above 69 over 100. Aesthetic satisfaction with the nose was therefore relatively good and the psychosocial repercussions were few, with no significant influence of gender. Feeling embarrassed about the nose or undergoing mockeries on the subject therefore seem to be minor issues. Although the scores were high in both groups, there were nevertheless some differences between them. Children and parents in the group having had primary rhinoplasty had a higher level of satisfaction concerning the appearance of the nose than those in the group without rhinoplasty. Despite the fact they seemed more satisfied with their nose, children who had primary rhinoplasty did not seem to enjoy any greater psychosocial benefit compared to the children who had no primary intervention on the nose. Thus, the apprehension of social relationships was comparable between the two groups of children in this study. However, the parents whose children underwent primary rhinoplasty had a clearly different view of their children's

psychosocial experience. They had a more positive view than did the parents whose children had not undergone rhinoplasty. This difference in feelings on the part of children and their parents in the primary rhinoplasty group could be the consequence of a divergence in perception linked to maturity, with a loss of carefree attitudes with age. In a recent study involving adults, rhinoplasty performed at the end of growth had a significant positive impact on laypersons' perception, on patients' self-esteem and on their perceptions of interpersonal experiences (Posnick et al., 2019). Two questions can thus be raised: Are adults more conscious of other people's judgment on other people's appearance? Were the children involved in this study too young to perceive the psychosocial benefits of an early nose surgical intervention?

Furthermore, when families were asked whether they wanted a further intervention, nearly half the families responded positively, suggesting aesthetic dissatisfaction, in particular in relation to the nose. Despite the fact that they showed little difference in terms of aesthetic satisfaction or psychosocial impact, the patients who did not undergo primary rhinoplasty more often expressed a desire for a further rhinoplasty intervention (42% versus 13%). This result provides more nuances to the small difference found among children in terms of aesthetic satisfaction and psychosocial repercussions in relation to their nose. Indeed, as underlined by Meyer-Marcotty (2009), nasal asymmetry, because of the central position on the face, appears to damage self-perception and other people's perceptions of the face. Meyer-Marcotty *et al.* (2011), in another study, compared in particular patients who had Class III skeletal discrepancy, with mandibular asymmetry, to patients with a CLP with nasal asymmetry. The patients with CLP had lower scores. Thus, asymmetry in relation to the median, and located in the middle of the face, seems more deleterious, which could explain why the nose underpins demands for further interventions, especially in CLP patients (Ben Bouhjar N. et al., 2019).

Concerning the different areas of the face and the face as a whole, levels of satisfaction were indeed high (medians above 80 over 100) and social repercussions scored high (medians above 86). Although dissatisfaction was therefore minor, it concerned, in decreasing order: the nose and smile on the same level, the upper lip, followed by the profile. This hierarchy also applied to scores for the psychosocial experience of the different aesthetic after-effects, with a slight difference, as the smile in this case obtained lower scores than the nose. The face as a whole generally obtained high scores (medians among children and parents were 87 and 88 over 100 respectively). Children and parents shared relatively homogeneous judgments. A Malaysian study conducted on the satisfaction of adolescents with a CLP regarding their facial appearance also showed a significantly high level of satisfaction and it was similar between the children and their parents. Similarly to our findings, this study showed that the teeth and nose were the facial criteria with the lowest scores (Noor and Musa, 2007). In the same way, a multicentre study, collecting 346 narratives from parents showed that most children with a CLP tolerated their congenital malformation and the required treatments well; 17% of the children experienced negative behavioural and emotional feelings, and only in a minor and temporary manner, and only 2% in major and lasting manner (Feragen *et al.* 2017). In a systematic review in 2011, Hunt *et al.* (2005) showed that most children with CLP did not seem to encounter any major psychosocial problems. Even if literature with a high level of evidence, i.e. meta-analyses, has identified a real negative influence of CLP on quality of life, the social dimension among children and adolescents appears to be the domain that was the least affected by oral-facial cleft. The aspects that were the most affected by CLP were psychological health (self-esteem, mental health relating to anxiety and depression) and physical health (daily activities, pain, and functioning) (Hutchinson *et al.* 2011). The scientific literature has underlined the importance of

satisfaction with facial appearance in managing social relationships (Hunt *et al.* 2005; Queiroz Herkrath AP *et al.* 2015). This result suggests the great importance in achieving satisfactory aesthetic results on patients with CLP.

Although the present study did not identify any significant difference in perception according to gender, a 2011 meta-analysis identified adult males as the most likely to develop psychosocial problems. Men seemed to adapt less well and to be less confident than women. This argument should be considered with caution as it is only a hypothesis, and also because this meta-analysis entailed considerable heterogeneity across the studies retained (Hutchinson *et al.* 2011).

This study set-up a designed questionnaire, not exclusively centred on the nose but which concerned several areas of the face that can be involved in cleft sequelae. The choice of not producing a questionnaire solely centred on the nose was strategic. For the purposes of the study, patients' families were not given any information about its main objective. Using only one question on only one subject could have seemed dubious and could have influenced the scores. Several themes were thus submitted to the families so that they would give information more easily without being able to identify the actual main objective of the study. In addition, the approach enabled the psychosocial impact of the dental-facial appearance to be assessed and the most problematic area of the face, in the children's view, to be determined.

However, this analysis revealed some limits. First, this study relies on a questionnaire inspired by Van Lierde survey (Van Lierde *et al.*, 2012). Although a pre-test was carried out before the study to validate its understanding, this questionnaire was not internationally validated. Second, nearly 40% of families in the two groups combined did not answer the letter that was sent to them. The results should be balanced as the families who did not answer may

have been the most disappointed. This could explain relatively the high scores which were obtained. Though, in both groups, the amount of no answers was comparable; therefore main differences highlighted about the nose should be taken into account. The number of included families was quite small which unpowered some results, such as the influence of gender. However, this report highlighted significant differences about nose appearance and its impact on social life, despite this small number of included patients. An objective evaluation of the nasal shape and of the facial symmetry (Al Rudainy et al., 2018; Kimura et al, 2019), realized in parallel to that study, have however reinforced these differences between the children who had primary rhinoplasty and those who did not. The authors include patients from 8 to 14, corresponding to pre-adolescence and beginning of adolescence. The nose is known to be modified a lot by puberty and growth. It would have been better to reduce the panel of ages, and to postpone it, as for example including patients from 14 to 17 years. This choice is explained by the two centers of group B, as the oldest patients of the surgeons with the same protocol were 14 years. The age interval could also explain that the nose does not seem to impact children in their social life even if they did not benefit from primary rhinoplasty. Young children might be not mature enough to realise this impact, whereas their parents notice it. Nevertheless, school, which is a place where children learn socialisation, can become a privileged place for verbal attack, especially among pre-adolescents between the ages of 8 and 14. Lorot-Marchand *et al.* highlighted the considerable impact of mockery in daily life in school sustained by children with CLP (2015). This age range is a key period, and it can be surmised that stigmatisation potentially affects these children's social and psychological development, and that consequently any early intervention aiming to lessen the impact of a cleft is probably beneficial for the children's development.

At the end of this study, the levels of satisfaction in the patients' families seemed good and the scores, surprisingly, were in a sense "too high": a discrepancy was observed between the considerable proportion of desires for further interventions, about 45%, and the satisfaction scores attributed to the different areas of the face affected by the CLP. How is it possible to want a surgical intervention when the level of satisfaction is very good? More than 80% of the families, for instance, stated that they were satisfied with the smile. However, children with a CLP often have severe malocclusions. The age range of the selected patients means that children at this stage are receiving orthodontic treatment and that the time until dental appliances are removed will be long. It is therefore legitimate to suppose either that the children, starting from a very severe state, and their parents, are really satisfied with the aesthetic results achieved so far, or that the simple fact of being cared for enables them to accept their smile more readily and thus come to terms with living with it.

The impact of family support on social adaptation was not studied in the present work. However, parental encouragement for a realistic self-assessment of the face and open parent/child communication have shown positive psychosocial results. This result suggests that failure in family support could be a potential risk factor for psychosocial disorders and dissatisfaction with facial appearance among children with CLP (Hutchinson *et al.* 2001; Richman *et al.* 2012);

Furthermore, in the present study, it was the medians that were taken into account to highlight the opinions of the largest number of participants. There were however some extreme values. Standard deviations were sometimes considerable. It would be interesting for further studies to identify protective factors and risk factors, to assess their impact on the levels of aesthetic and psychosocial satisfaction among children with CLP. Once these factors are identified, strategies

for psychological support could prevent the development of disorders among the children most at risk. Media campaigns on the acceptance of physical differences could, among other things, constitute a strategy to reduce discrimination and prejudice towards children and adolescents with a facial anomaly.

Finally, only primary rhinoplasty, carried out at the age of 6 months at the same time as cheiloplasty, seems to have a real impact since these children (and their parents) were less likely to ask for a secondary intervention (Fig. 1). Gudis and Patel (2014) reported that primary rhinoplasty could reduce the frequency and the extent of intermediate and definitive rhinoplasty. Ideally, a minimum number of interventions is better, as an increase in the number of nose interventions increases surgical difficulties because it generates fibrous tissues, thus making later corrections difficult to achieve and less visible (24). This study encourages performing primary rhinoplasty even if a perfect result is not obtained for nasal appearance in every case. Nevertheless, if the aesthetic result obtained through primary cheilo-rhinoplasty is not the one that was hoped for, a second rhinoplasty intervention is then desirable, ideally at the end of the child's growth, or earlier if the child shows real psychological distress (Dissaux *et al.* 2015; Talmant *et al.* 2016; Okawachi *et al.*, 2020; Zhou *et al.*, 2020).

Conclusion

The children who underwent primary rhinoplasty surgery and their parents were more satisfied with the nose than the non-operated children. Despite the fact that social relationships, particularly with regard to mockeries about the nose, seemed comparable whether or not the children had undergone primary rhinoplasty, their parents judged their children's psychosocial

experience significantly better if they had had this primary nose intervention. This observation was reinforced by the fact there was less desire for a further nose intervention for those who had undergone primary rhinoplasty. Not wishing for an intervention could suggest that the aspect of the nose is better accepted and helps children to live with it. Thus, beside its functional role on facial growth by restoring nasal breathing, this study shows that primary rhinoplasty seems to have a positive psychosocial impact and should be performed whenever possible in cleft centers. Quality of life analyses have however only been recently conceptualised and are difficult to conduct. Because appearance today has an important role in our social relationships, the advantages of primary rhinoplasty should be further explored in future larger-scales studies.

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References

Albers AE, Reichelt AC, Nolst-Trenite GJ, Menger DJ: Feeling normal? Long-term follow-up of patient with a cleft lip-palate after rhinoplasty with the Derriford appearance scale (DAS-59).

Facial Plast Surg 32: 219 224, 2016

Al-Rudainy D, Ju X, Stanton S, Mehendale FV, Ayoub A : Assessment of regional asymmetry of the face before and after surgical correction of unilateral cleft lip, J Craniomaxillofac Surg

46: 974 978, 2018

Attia SA, Helal HA, El Barabary AS, Awad MA, Sherif MM: Impact of nasalis muscle repair in unilateral cleft lip patients, J Craniomaxillofac Surg 47: 255 262, 2019

Ben Bouhjar N, Kleinheinz J, Dirksen D , Berssenbrügge P, Runte C, Wermker K: Facial and midfacial symmetry in cleft patients: Comparison to non-cleft children and influence of the primary treatment concept. J Craniomaxillofac Surg 47: 741 749, 2019

Dissaux C, Bodin F, Grollemund B, Picard A, Vazquez M-P, Morand B, James I, Kauffmann I, Bruant-Rodier C: Evaluation of 5-year-old children with complete cleft lip and palate:

Multicenter study. Part 1: Lip and nose aesthetic results. J Craniomaxillofac Surg 43: 2085 2092, 2015.

Feragen KB, Semb G, Heliövaara A, Lohmander A, Johannessen EC, Boysen BM, Havstam C, Lundeberg I, Nyberg J, Pedersen N-H, Bogh-Nielsen, Eyres P, Bradbury E, Rumsey N: Scandcleft randomised trials of primary surgery for unilateral cleft lip and palate: Parental perceptions of appearance and treatment outcomes in their 5-year-old child. *J Plast Surg Hand Surg* 51(1): 81-87, 2017.

Gkantidis N, Papamanou DA, Christou P, Topuzelis N: Aesthetic outcome of cleft lip and palate treatment. Perceptions of patients, families, and health professionals compared to the general public. *J Craniomaxillofac Surg* 41: 105-110, 2013

Gudis DA, Patel KG. Update on primary cleft lip rhinoplasty. *Curr Opin Otolaryngol Head Neck Surg* 22(4): 260-266, 2014.

Gupta A, Svider PF, Rayess H, Sheyn A, Folbe AJ, Eloy JA, et al.: Pediatric rhinoplasty: A discussion of perioperative considerations and systematic review. *Int J Pediatr Otorhinolaryngol* 92: 11-16, 2017.

van der Heijden P, Korsten-Meijer AG, van der Laan BF, Wit HP, Goorhuis-Brouwer SM: Nasal Growth and Maturation Age in Adolescents: A Systematic Review. *Arch Otolaryngol Neck Surg* 134(12): 1288-1293, 2008.

Hunt O, Burden D, Hepper P, Johnston C: The psychosocial effects of cleft lip and palate: a systematic review. *Eur J Orthod* 27(3): 274 285, 2005.

Hutchinson K, Wellman MA, Noe DA, Kahn A: The psychosocial effects of cleft lip and palate in non-Anglo populations: a cross-cultural meta-analysis. *Cleft Palate Craniofac J* 48(5): 497 508, 2011.

Kapp-Simon KA, Mc Guire DE: Observed social interaction patterns in adolescents with and without craniofacial conditions. *Cleft Palate Craniofac J* 34(5): 380 384, 1997.

Kim S, Cha B, Lee K, Park J: Primary correction of unilateral cleft lip nasal deformity in Asian patients: anthropometric evaluation. *Plast Reconstr Surg* 114(6): 1373 1381, 2004.

Kimura N, Nozoe E, Okawachi T, Ishihata K, Fuchigami T, Nakamura N: Three-dimensional analyses of nasolabial forms and upper lip surface symmetry after primary lip repair in patients with complete unilateral cleft lip and palate, *J Craniomaxillofac Surg* 47: 245 254, 2019

Lockhart E: The mental health needs of children and adolescents with cleft lip and /or palate.

Clin Child Psychol Psychiatry 8: 7-16, 2003.

Lorot-Marchand A, Guerreschi P, Pellerin P, Martinot V, Gbaguidi CC, Neiva C, Devauchelle B, Frochisse C, Poli-Merol ML, Francois-Fiquet C: Frequency and socio-psychological impact of taunting in school-age patients with cleft lip-palate surgical repair. *Int J Pediatr Otorhinolaryngol* 79(7): 1041-1048, 2015.

Meyer-Marcotty P, Stellzig-Eisenhauer A: Dentofacial self-perception and social perception of adults with unilateral cleft lip and palate. *J Orofac Orthop* 70(3): 224-236 2009.

Meyer-Marcotty P, Kochel J, Boehm H, Linz C, Klammert U, Stellzig-Eisenhauer A: Face perception in patients with unilateral cleft lip and palate and patients with severe Class III malocclusion compared to controls. *J Craniomaxillofac Surg* 39(3): 158-163, 2011.

Millar K, Bell A, Bowman A, Brown D, Lo TW, Siebert P, Simmons D, Ayoub A: Psychological status as a function of residual scarring and facial asymmetry after surgical repair of cleft lip and palate. *Cleft Palate Craniofac J* 50(2):150-7, 2013

Naros A, Brocks A, Kluba S, Reinert S, Krimmel M: Health-related quality of life in cleft lip

and/or palate patients – A cross-sectional study from preschool age until adolescence. J
Craniomaxillofac Surg 46: 1758 1763, 2018

Noor SN, Musa S: Assessment of patients' level of satisfaction with cleft treatment using the
Cleft Evaluation Profile. Cleft Palate Craniofacial J 44(3) 292 303, 2007.

Okawachi T, Ishihata K, Nomoto N, Tezuka M, Kamikuri Y, Nozoe E, Nakamura N: Using
three-dimensional nasal forms to compare definitive unilateral cleft lip nose correction
with/without a cross-lap joint cartilage graft technique, J Craniomaxillofac Surg 48: 1035 1044,
2020

OosterkamP BC, Dijkstra PU, Remmelink HJ, van Oort RP, Goorhuis-Brouwer SM, Sandham A
et al.: Satisfaction with treatment outcome in bilateral cleft lip and palate patients. I J Oral
Maxillofac Surg 36: 890 895, 2007.

Posnick JC, Susarla SM , Kinard BE: Reconstruction of residual cleft nasal deformities in
adolescents: Effects on social perceptions, J Craniomaxillofac Surg 47(9): 1414 1419, 2019

Pope AW, Ward J: Factors associated with peer social competence in preadolescents with

craniofacial anomalies. *J Pediatr Psychol* 22: 455-469, 1997.

Queiroz Herkrath AP, Herkrath FJ, Rebelo MA, Vettore MV: Measurement of health-related and oral health-related quality of life among individuals with nonsyndromic orofacial clefts: a systematic review and meta-analysis. *Cleft Palate Craniofac J* 52(2): 157-172, 2015.

Roosenboom J, Hellings PW, Picavet VA, Prokopakis EP, Antonis Y, Schoenaers J, Vander Poorten V, Claes P, Hens G: Secondary cleft rhinoplasty: impact on self-esteem and quality of life. *Plast Reconstr Surg* 134: 1285-1292, 2014

Richman LC, McCoy TE, Conrad AL, Nopoulos PC: Neuropsychological, behavioral, and academic sequelae of cleft: early developmental, school age, and adolescent/young adult outcomes. *Cleft Palate Craniofac J* 49(4): 387-396, 2012.

Shaw, WC, Semb G, Nelson P, Brattstrom V, Molsted K, Prah-Andersen B et al.: The eurocleft project 1996-2000: overview. *J Craniomaxillofac Surg* 29: 131-142, 2001.

Slifer KJ, Diver T, Amari A, Cohn JF, Hilley L, Beck M, McDonnell S, Kane A: Assessment of facial emotion encoding and decoding skills in children with and without oral clefts. *J*

Craniomaxillofac Surg 31: 304–315, 2003

Smahel Z, Müllerová Z, Nejedlý A: Effect of primary repositioning of the nasal septum on facial growth in unilateral cleft lip and palate. Cleft Palate Craniofac J 36(4): 310–313, 1999.

Talmant JC, Talmant JC, Lumineau JP: Primary treatment of cleft lip and palate. Its fundamental principles. Ann Chir Plast Esthet 61(5): 348–359, 2016.

Van Lierde KM, Dhaeseleer E, Luyten A, et al.: Parent and child ratings of satisfaction with speech and facial appearance in Flemish pre-pubescent boys and girls with unilateral cleft lip and palate. Int J Oral Maxillofac Surg 41: 192–199, 2012.

Witsenburg B: The reconstruction of anterior residual bone defects in patients with cleft lip, alveolus and palate. A review. J Maxillofac Surg 13(5): 197–208, 1985.

Zhou F, Lin W, Du Y, Li S, Jiang H, Wan L, Yuan H : Single-stage repair of secondary unilateral cleft lip-nose deformity in adults, J Craniomaxillofac Surg 48: 83–89, 2020

Figures legend

Figure 1: Illustrations of a case operated in the center performing primary cheilorhinoseptoplasty using Talmant technique (Talmant et al., 2016).

A – Pre-operative status (Face and low-angle views)

B- Immediate one week-post-operative status (Face and low-angle views)

C- Pictures of the same patient at the age of this study evaluation (Patient was 13 years old). To the face and low-angle views, the authors decided to add a profile view to show how primary rhinoplasty could have an impact on nasal morphology through growth but also on functional outcome, as the projection of the nose and the maxilla in this case are favourable. Primary rhinoseptoplasty restores early nasal breathing and so has a positive impact on maxillary growth.

Figure 2: Schematic representation of the Nasalis muscle of a total unilateral cleft lip and palate: it is composed of the transverse muscle in its upper part and of the myrtiform muscle in its lower part. It covers the lateral crus of the alar cartilage, induces its caudal rotation and so creates the nostril band, which forms a vertical relief in the nasal vestibule and increases the eversion of the nostril.

Figure 3: Surgical technique described by Talmant (Talmant et al., 2016) of primary cheilo-rhinoseptoplasty performed at the age of 6 months.

Figure 4: Example extracted from children and parents versions of questionnaires about one item: the nose

Figure 5: Inclusion flowchart for patients' families

Figure 6: Mean scores (rated from 0 to 100) attributed by the children and parents concerning satisfaction with dental-facial appearance and psychosocial easiness

Figure 7: Global Scores (rated from 0 to 500) attributed to dentofacial appearance and psychosocial easiness, all variables confounding (addition of scores of Nose + Profile+ Face + Upper lip+ Smile, each score being over 100, global score is over 500), depending on gender.

Tables legend

Table 1: Children's characteristics according to compared groups A and B

Table 2: Comparison of mean scores (scores is rated from 0 to 100) attributed by children and parents concerning satisfaction with the appearance of the nose and psychosocial disturbances, for groups A and B

Table 3: Desire for further interventions

Figure 1:

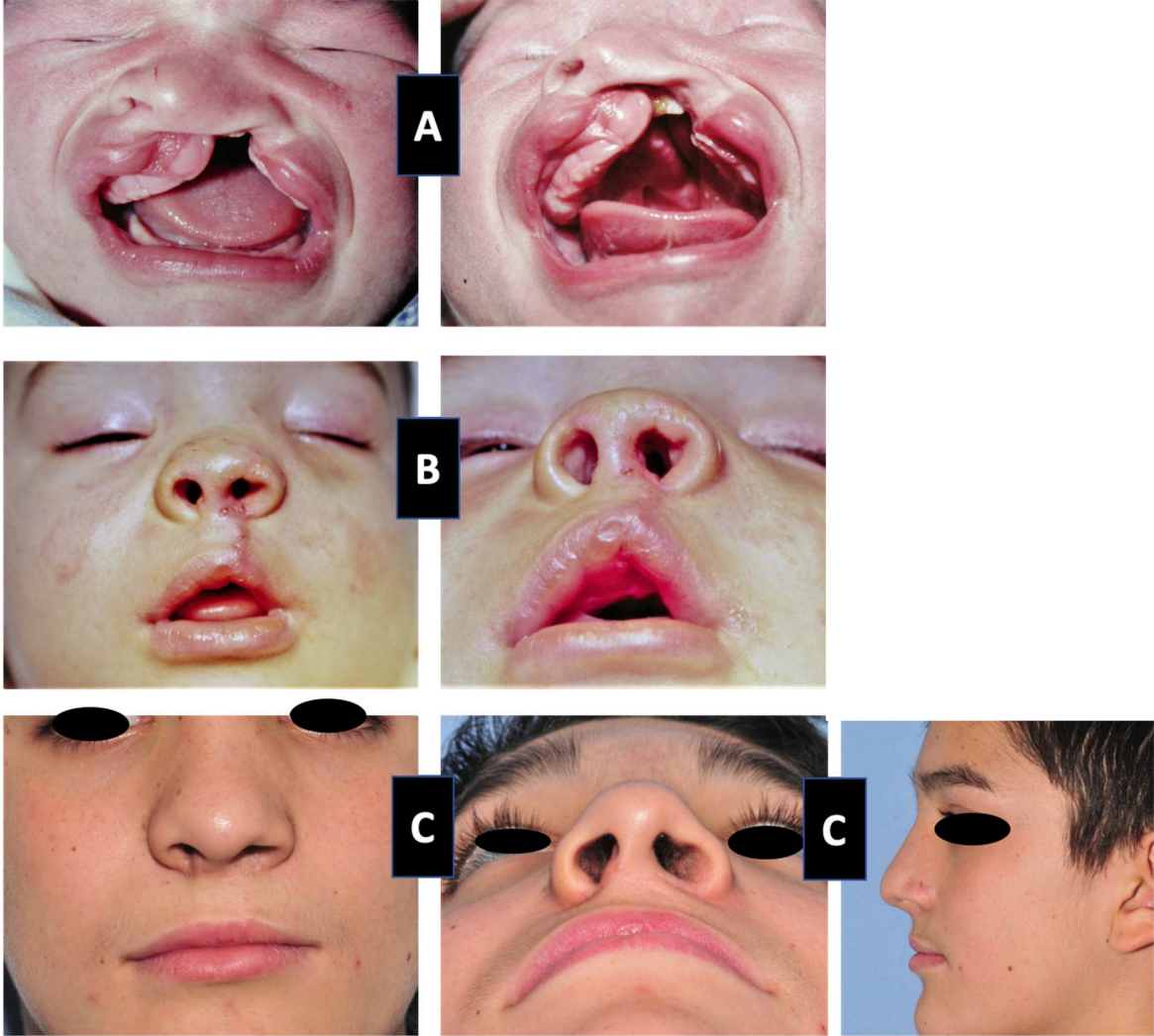


Figure 2:



Figure 3:

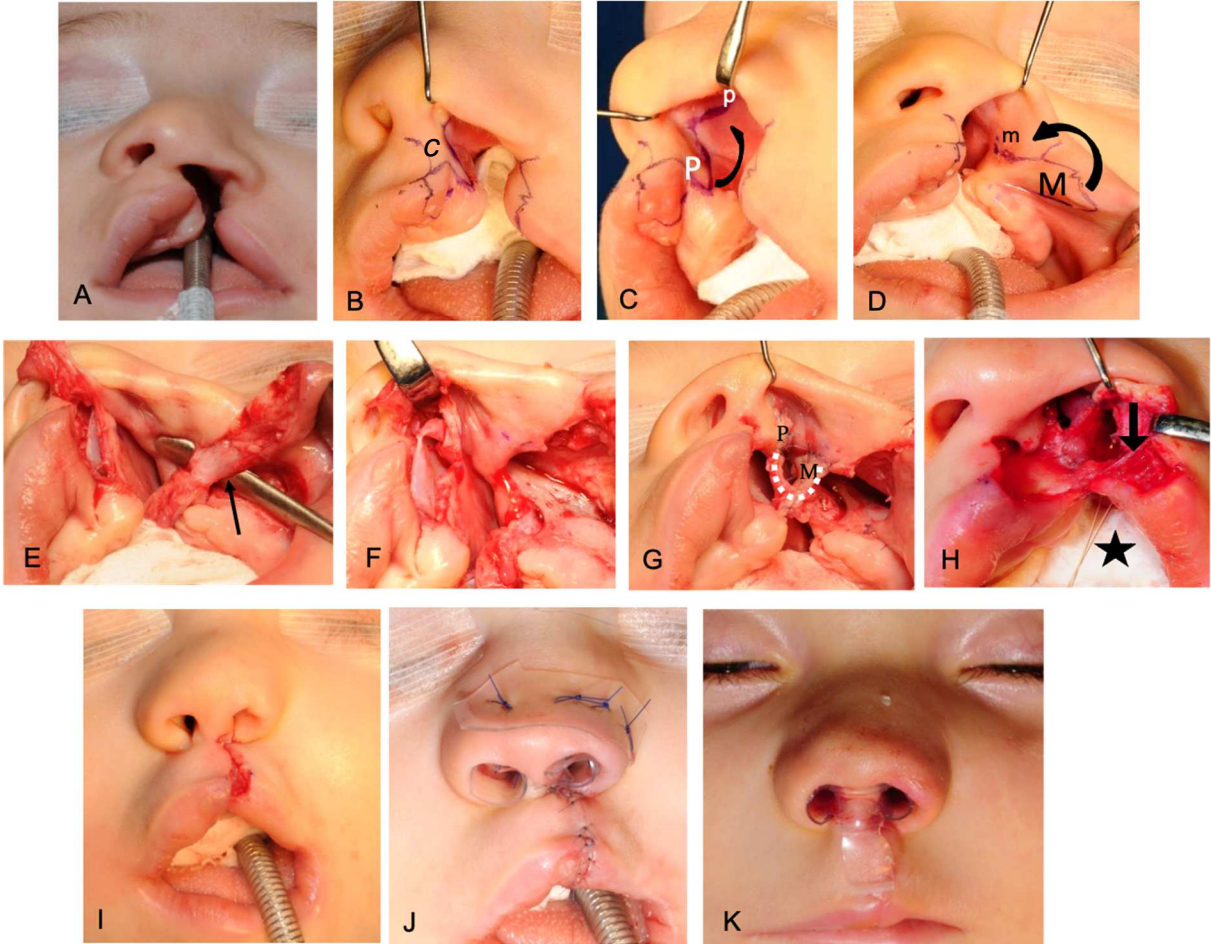
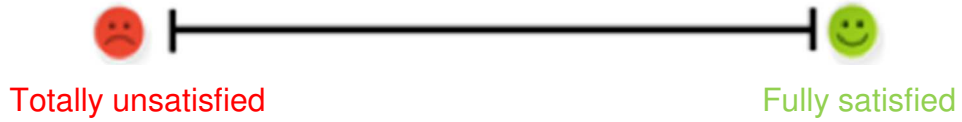


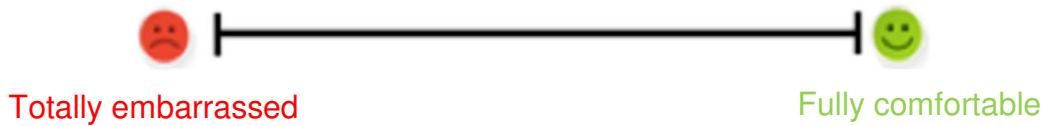
Figure 4:

THE NOSE (children's version):

Are you happy about the appearance of your nose ?

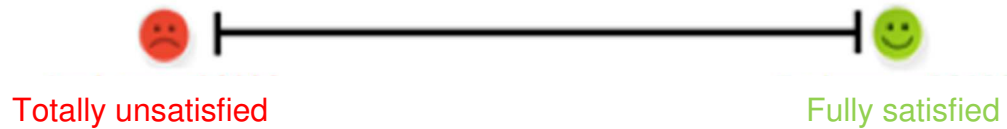


How embarrassed do you feel by the appearance of your nose in your social relationships (teasings, having complex of your nose)



THE NOSE (parents' version)

What is your level of satisfaction about the appearance of your child's nose?



In what measure do you think the nose of your child impacts his social life (teasings, complex about his nose)

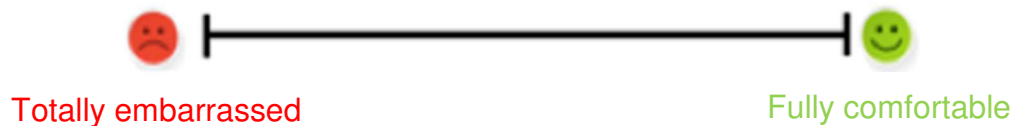


Figure 5:

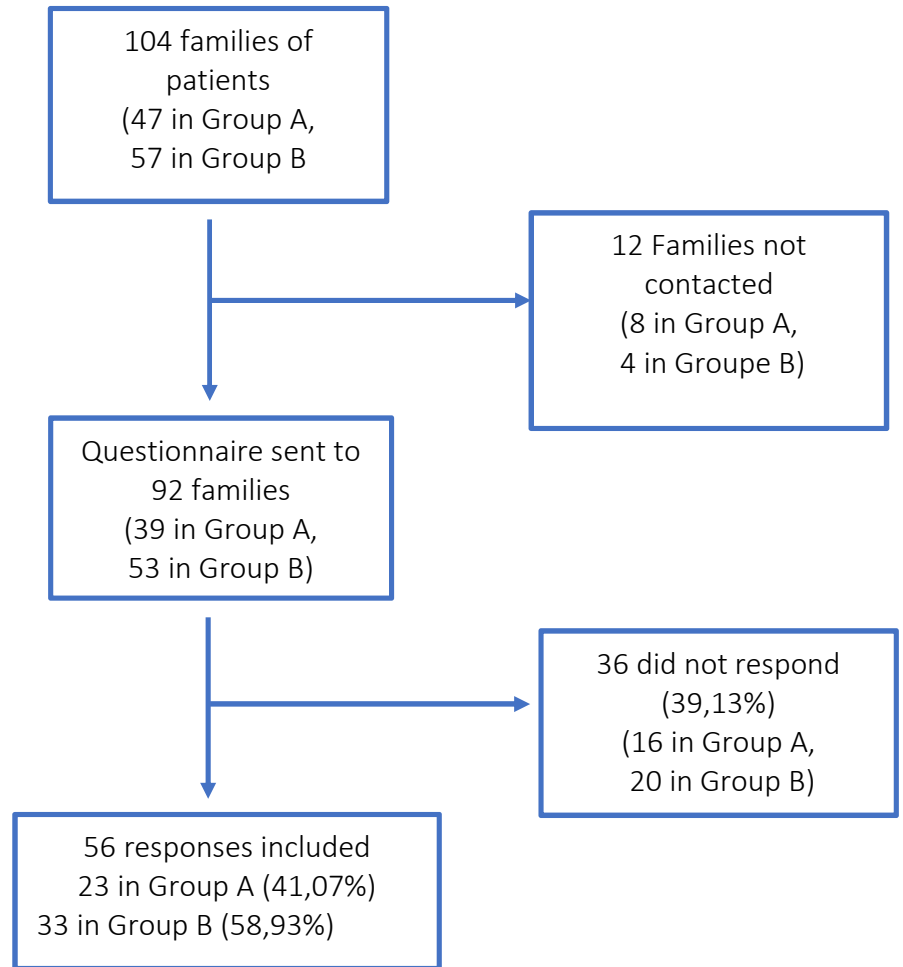


Figure 6 :

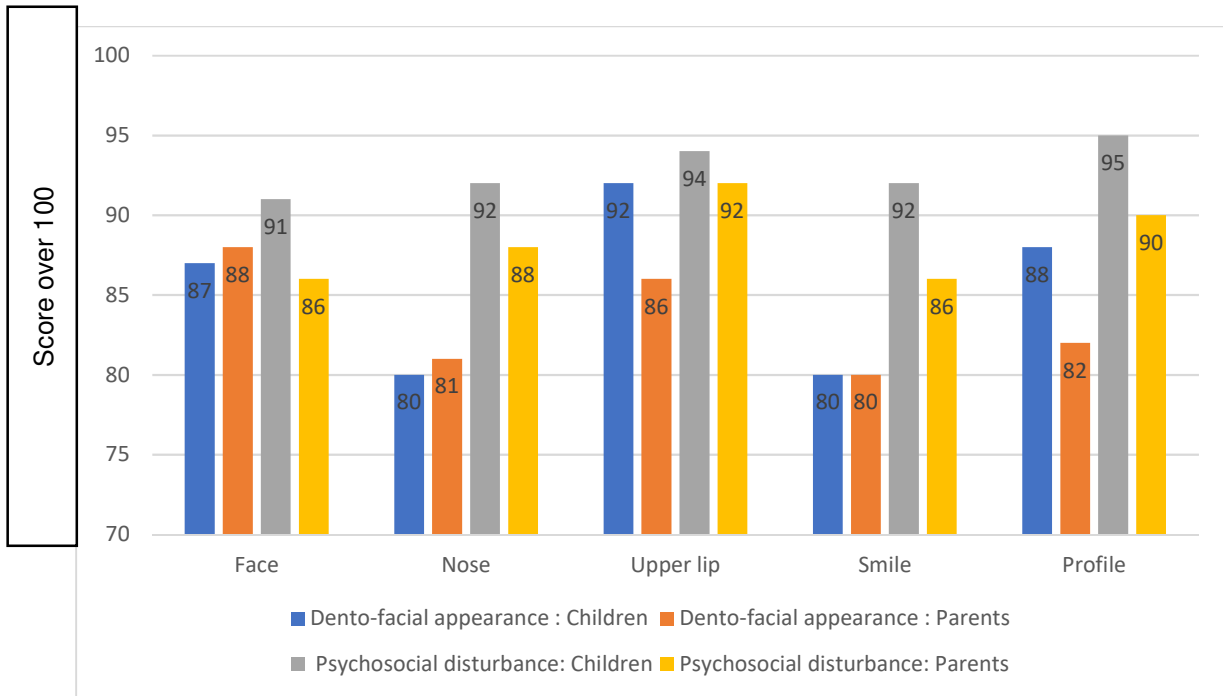
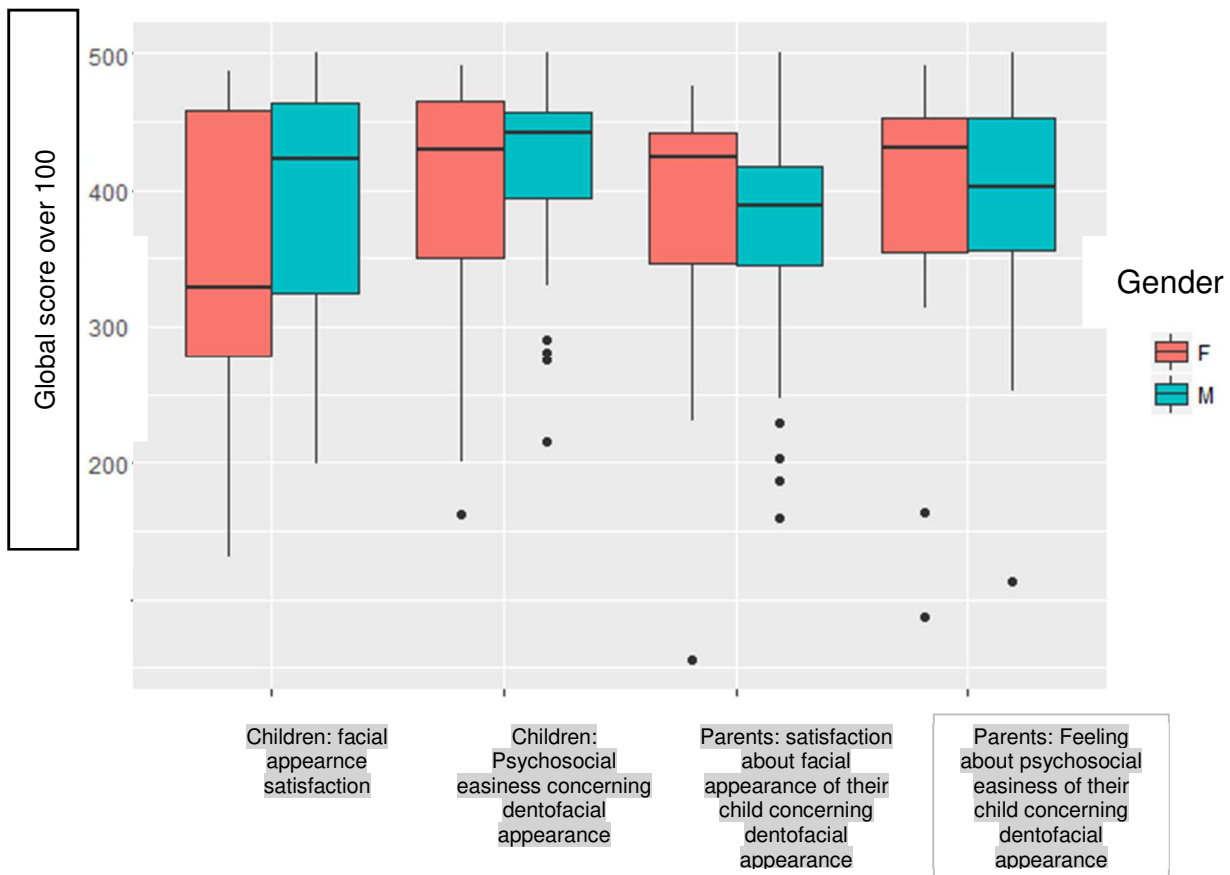


Figure 7:



Children	Number	Mean age (years)	Minimum age (years)	Maximum age (years)	Gender F*	Gender M*
A	23	11.05	9,3	12.6	6	17
B	33	10.9	8	13.8	11	22

Table 1: Children's characteristics according to compared groups A and B

Types of indicators Compared groups		Children		Parents	
		Satisfaction with nose appearance (score over 100)	Psychosocial easiness (score over 100)	Satisfaction with nose appearance (score over 100)	Psychosocial easiness perceived (score over 100)
A	Median	90	90	86	90
	Standard deviation	25.07	17.43	10.52	16.91
B	Median	73	93	69	86
	Standard deviation	30.96	22.44	26.66	26.58
Differences in the medians		17	-3	17	4
C.I.* 95%		-7.51 – 22.51	-11.45 – 9.88	10.02 – 30.89	0.91 – 24.68
Percentage of Likelihood that A > B		83.4%	45.6%	100%	98.3%

Table 2: Comparison of mean scores attributed by children and parents concerning satisfaction with the appearance of the nose and psychosocial disturbances, for groups A and B.

CI= Confidence Interval

The Bayesian statistic does not consider results in “statistically” or “non-statistically significant” mode, but gives a “percentage of likelihood” of obtaining such or such a result. It is the investigator's role to determine the threshold for statistical significance. In the present study, the statistical significance was fixed at 95%. Thus, in case of a percentage of

likelihood, as in the last line of table 2, exceeding 95%, we refer to “statistically significant result”.

Desire for further interventions	Proportion Groups A and B combined	Proportion group A	Proportion group B
Yes	44.23%		
No	55.77%		
Nose	30.35%	13.04%	42.42%
Upper lip	7.14%		
Teeth	7.14%		
Orthognathic surgery	1.79%		
Other*	3.57%		

Table 3: Desire for further interventions

*Other: quoted from the responses: "reduction of the upper labial frenulum" and "gums"