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Otoplasty in patients with helix valgus: quality of life and satisfaction

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Abstract

Background Importance of helix valgus lies in the psychological and social effect it could have on the patient. Our objective was to assess the impact of otoplasty on the quality of life of children with prominent ears and to establish possible predictors of post-surgical outcomes.

Material and methods A retrospective review of children with prominent ears who underwent otoplasty between 2016 and 2018 was conducted. Demographical information, medical history, characteristics of helix valgus, motivations for surgery, complications, and post-surgical satisfaction were collected. To assess changes in parent-reported quality of life and patient satisfaction following surgery, the validated Glasgow Children's Benefit Inventory (GCBI) and Patient Outcomes of Surgery-Head/Neck (POS-Head/Neck) surveys were used, respectively.

Results Fifty-three patients responded to the survey (64.6%). From those, 90.6% of parents reported an improvement in health-related quality of life after otoplasty, with a 24.6 ± 20.6 average score on the global GCBI scale. The post-surgical score on the POS-Head/Neck surveys was significantly higher than the pre-surgical score ($p < 0.0001$), suggesting an improvement in patient-reported aesthetic appearance. Analysis of possible predictive factors showed significant differences regarding age. Children over 10 years of age obtained significantly higher scores in both questionnaires.

Conclusions Otoplasty has a clear positive impact on the quality of life of children with prominent ears. Age at the time of surgery appears to be a predictor of post-surgical outcomes. Our results would justify delaying surgery until 10 years old.

Keywords Child, Otoplasty, Quality of life, Patient satisfaction, Surveys and questionnaires

Background

Helix valgus is the most common congenital ear malformation, affecting 5% of the Caucasian population. It occurs as a result of variable association of two anatomical defects: underdevelopment of the antihelix and concha cartilage hypertrophy [1]. Although this malformation does not imply functional limitations, the associated aesthetic defect can produce significant psychosocial problems in affected patients. Children with prominent ears are more likely to be teased by their peers, resulting in low self-esteem, lack of self-confidence, social isolation, and ultimately increasing the risk of depression in adulthood [2, 3].

Otoplasty has become one of the most frequently requested cosmetic surgeries in children and adolescents [4]. The service portfolio of *Comunidad de Madrid* covers this surgery up to the age of 16, in patients with associated psychosocial problems. The objective is to improve health-related quality of life, understanding this as a multidimensional concept that integrates physical, psychological and social well-being [5]. Evaluating changes in quality of life after surgery is especially useful when

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assessing the results of otoplasty, whose benefits are mainly subjective.

Numerous studies have shown an improvement in health-related life quality after otoplasty in children and adults with prominent ears; however, the results are not always satisfactory [4, 6–10]. This fact makes it necessary to correctly select patients who will undergo surgery. In our centre, the surgical indication is based on the request for the procedure by the child or adolescent and is only considered from the age of 6, when the child has the capacity to express their concern and request the surgery on their own [11].

The main objective of this study is to evaluate the satisfaction of paediatric patients who underwent surgery for prominent ears in our centre between 2016 and 2018, as well as to assess the impact of otoplasty on their quality of life. The secondary objective is to identify factors related to changes in their quality of life after surgery and to raise the need to modify the criteria for surgical indication based on the results.

Material and methods

Study design

Patients under 17 years old who had surgery for prominent ears at *Hospital Universitario 12 de Octubre* in Madrid between 1 January 2016 and 31 December 2018 were reviewed retrospectively. A total of 123 records were obtained, of which 31 (25.2%) were excluded due to erroneous coding or procedures performed by a team other than the Children's Plastic Surgery team. Demographic data, helix valgus characteristics, surgical procedure, and postoperative complications of the remaining 92 (74.8%) cases were collected.

Parents or caregivers of the 92 patients included were contacted; 82 (89.1%) out of them gave oral consent to participate in the study, providing their email addresses. Two surveys—one for the patient and one for the parents or caregivers—were sent to be completed according to the attached instructions and then forwarded to the corporate email of the primary author. To increase the reply rate, two reminder messages were sent, one at 15 days and one at 1 month from the first mail. Ultimately, 53 patients forwarded the questionnaires that had been fully or partially completed, representing a reply rate of 64.6%.

Surgical technique

All of the cases were operated following the Mustardé technique, with anterior curettage of the underdeveloped cartilage. The curettage is made through a 0.5-cm incision in the upper margin of the helix, using a curve curette. An elliptical incision in the posterior face of the auricle is made to reach the cartilage. After proper dissection of the tissue, we shape the antihelix with three stiches, using absorbable polyglactine 3/0. Excessive auricle projection is corrected using 2 or 3 Furnas stiches. In patients with hypertrophy of the concha, we perform an elliptical incision of the cartilage, suturing the wound with ethilon 6/0 (Fig. 1).

Questionnaires

The questionnaires were sent as two different files: one for the parent or caregiver and another for the patient. Both files contained a general survey with questions about family history of helix valgus, the motivation for surgery, pre-surgery expectations, and general satisfaction. In addition, the parent's survey included the *Glasgow Children's Benefit Inventory* (GCBI) and the patient's one included the *Patient Outcomes of Surgery-Head/Neck* (POS-Head/Neck), translated into Spanish by the study authors.

The *Glasgow Children's Benefit Inventory* (GCBI) is a validated questionnaire designed to assess changes in health-related quality of life following paediatric surgery. It consists of 24 questions, to be answered retrospectively by parents or primary caregivers, according to a Likert-type scale of 1 to 5. The total score is transformed into a scale ranging from −100 (maximum harm) to +100 (maximum benefit), with 0 representing a neutral effect or no change in health-related quality of life. In addition, it establishes 4 subscales representing typical areas of daily life: emotion, physical health, learning, and vitality [12].

The *Patient Outcomes of* Surgery-Head/Neck (POS-Head/Neck) is a validated questionnaire designed to assess outcomes and patient-reported satisfaction following head/neck soft tissue surgery. It includes two versions: pre-surgical and post-surgical. The pre-surgical version consists of 6 items that assess the patient's psychological functioning and aesthetic appearance prior to surgery. The post-surgical version includes two scales, one equivalent to the pre-surgical and another with 3 items, which assesses overall post-surgical satisfaction. The score of the pre- and post-surgical psychological functioning and aesthetic appearance scale (maximum 30 points) and the post-surgical satisfaction scale (maximum 11 points) are transformed into a scale from 0 to 100, with higher scores implying better results [13].

Statistical analysis

The description of all parameters was made according to the nature of the variables. Average (mean or median) and dispersion (standard deviation or interquartile range) measurements were included with a 95% confidence interval for quantitative variables and as absolute and relative frequencies for qualitative variables. Association between the variables was calculated

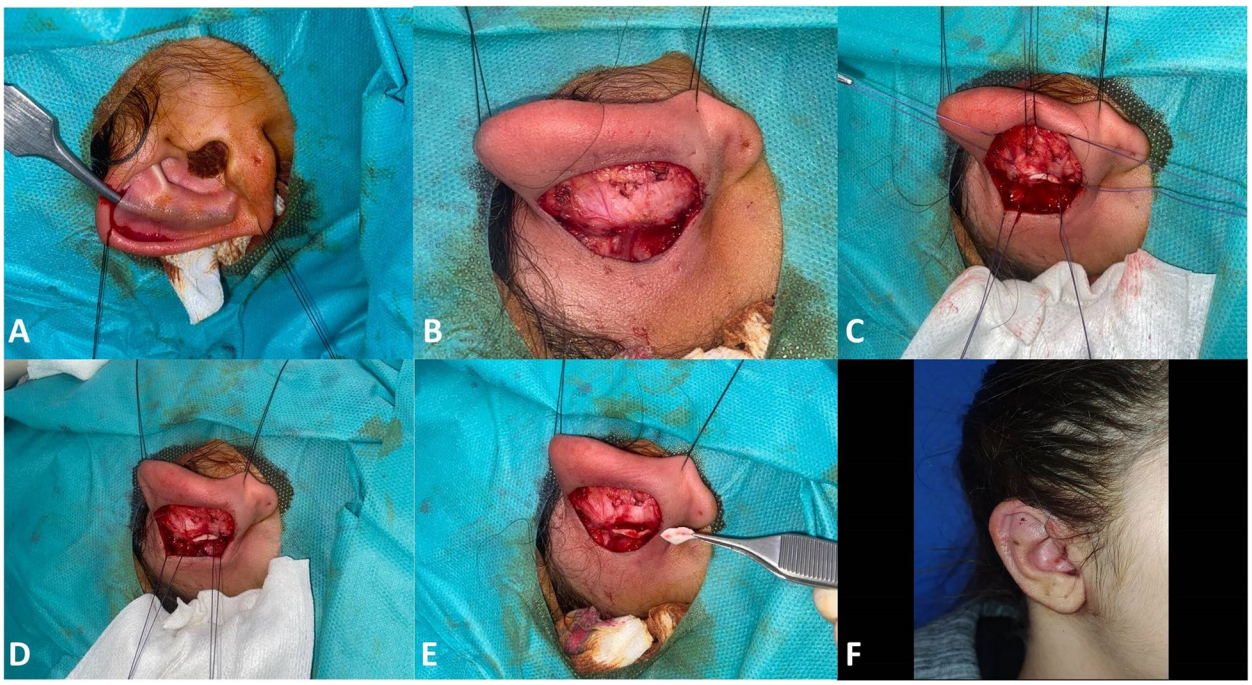

Fig. 1 Surgical technique. **A** Anterior curettage of the antihelix. **B** Elliptical skin incision in the posterior face of the auricle. **C**, **D** Mustardé and Furnas stiches. **E** Resection of excessive cartilage in the concha. **F** Postoperative result

using the Mann-Whitney *U* test. Statistical significance was established at a value of $p < 0.05$. All statistical analyses were performed with Minitab® version 17. Microsoft Excel 2010 was used to produce the database and graphs.

Results

Patient's characteristics

Out of the 53 survey respondents, 30 patients were female (56.6%). The average age at the time of surgery was 11.9 ± 2.9 years old (6.3–16.4) and at the time of the survey 13.8 ± 3 (8–18 range). The average time between operation and retrospective data collection was 2.3 years old (0.9–3.8 range). Sixty-six percent of the patients had a family history of prominent ears. Helix valgus was bilateral in 77.4% of cases.

The modified Mustardé technique with anterior curettage of the antihelix was performed on all patients. In addition, 21 (39.6%) cases required resection of the concha cartilage because of its high projection. Otoplasty was performed as a treatment for recurrence in 11 children (20.7%).

Complications were found in 15 patients (28.3%): the most frequent (8–53.3%) was recurrence, followed by pathological scarring (3–20%), surgical wound infection (3–20%), and bleeding (2–13.3%).

Patient's satisfaction

The main motivation for the children to undergo otoplasty was aesthetic concern (58.5%), followed by lack of self-esteem (47.2%), teasing or bullying (35.9%), anxiety (33.9%), and parental concern (13.2%).

Average score on the POS-Head/Neck psychological functioning and aesthetic appearance scale was 55.9 ± 16.7 pre-surgically and 86.5 ± 15.7 post-surgically, with this difference in scores being statistically significant ($p < 0.0001$).

Average score on the POS-Head/Neck global post-surgical satisfaction scale was 73.45 ± 18.44. A total of 79.2% of patients reported a result above or in line with the preoperative expectations, and 84.9% would recommend the intervention.

Parent-informed health-related quality of life

The main motivation of parents to have their child undergo an otoplasty was the lack of self-esteem (64.2%), followed by mockery or bullying (49.1%), aesthetic concern (47.2%), parental concern (24.5%), and anxiety (7.6%).

Average score on the global GCBI scale was 24.6 ± 20.6; the average scores on the emotion, physical health, learning, and vitality subscales were 35.9 ± 29.4, 13.6 ± 9.4, 18.2 ± 20.3, and 27.1 ± 27.4, respectively (Fig. 2). A large

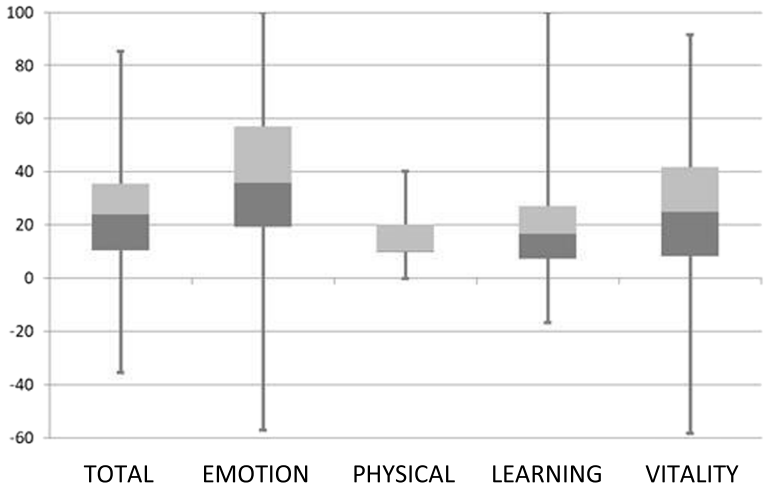

Fig. 2 Boxplot representing the Glasgow Children's Benefit Inventory (GCBI) scores after otoplasty

proportion of parents, 90.6%, reported an improvement in health-related quality of life after otoplasty. The total score was negative in only 2 (3.8%) cases, both associated with recurrence.

In terms of overall satisfaction after surgery, 79.2% of the parents were very or totally satisfied, while 92.5% would recommend surgery to the child of a relative or friend with the same problem.

Predictors of changes in quality of life and satisfaction

Impact of seven factors (that, according to the authors' criteria, could influence changes in quality of life and satisfaction after surgery) was analysed: sex (male or female), age at the time of surgery (≤ 10 or > 10 years old), motivation for surgery (including bullying or not), laterality of the helix valgus (unilateral or bilateral), previous otoplasty (yes or no), surgical technique (with or without concha resection), and post-surgical helix valgus recurrence (yes or no). The results are shown in Table 1.

Significant age-related differences were found. Parents of children over 10 years old reported an improvement in health-related quality of life ($p = 0.0116$). Likewise, children older than 10 years old experimented a greater improvement in psychological functioning and aesthetic appearance than children younger than or equal to 10 years old ($p = 0.0268$). Results of the POS-Head/Neck questionnaire in these two age groups showed that children > 10 years old were significantly more dissatisfied with the shape of their ears before surgery ($p = 0.0101$); however, no significant differences were found in the post-surgical scores (Table 2).

Table 1 Analysis (Mann-Whitney test) of 7 variables regarding the total GCBI score and the difference in pre- and post-surgical POS-Head/Neck score

Variable	GCBI global scale score[a]	*P*	Difference in pre and post-surgical score POS[a]	*P*
Sex				
Male	16.67 (22)	0.4688	20.00 (21)	0.0706
Female	27.08 (30)		36.66 (29)	
Age				
≤ 10 years old	10.42 (15)	0.0116	15.01 (14)	0.0268
> 10 years old	27.08 (37)		33.34 (36)	
Motivation				
No bullying	20.83 (26)	0.2271	31.66 (24)	0.7490
Bullying	27.09 (26)		33.34 (25)	
Lateralism				
Unilateral	16.67 (11)	0.5985	26.66 (12)	0.3458
Bilateral	25.00 (41)		33.34 (38)	
Previous otoplasty				
No	22.92 (41)	0.3133	26.67 (39)	0.1279
Yes	27.08 (11)		46.67 (11)	
Concha resection				
No	18.75 (31)	0.3135	30.00 (31)	0.6967
Yes	29.17 (21)		33.33 (19)	
Postsurgical recurrence				
No	27.08 (44)	0.0010	33.33 (43)	0.3348
Yes	7.29 (8)		30.00 (7)	

Abbreviations: *GCBI* Glasgow Children's Benefit Inventory, *POS* Patient Outcomes of Surgery-Head/Neck

[a] The median of the overall GCBI score and the pre- and post-surgical score difference in the POS-Head-Neck is expressed, with the size of each subgroup in parentheses. A value of $p < 0.05$ is considered statistically significant

Table 2 POS-Head/Neck results according to age variable

Age	POS-Head/Neck		
	Pre-surgical psychological and aesthetic scale	Post-surgical psychological and aesthetic scale	Post-surgical satisfaction scale
≤ 10 years old (*N* = 14)	64.67 ± 18,89	85.78 ± 16.69	64.84 ± 23.27
> 10 years old (*N* = 36)	52.19 ± 14,41	86.86 ± 15.47	77.14 ± 14.85
P	0.0101	0.7296	0.1198

Scores are expressed as mean and standard deviation. A value of $p < 0.05$ is considered statistically significant

On the other hand, children with post-surgical recurrence had significantly lower scores in terms of parent-reported quality of life ($p = 0.0010$).

Discussion

While not causing a functional limitation, prominent ears can affect psychosocial development during childhood. Thus, otoplasty should not be considered a purely aesthetic intervention. Several studies have shown an improvement in health-related quality of life after otoplasty [4, 7–10]. This data is corroborated in our study, which shows a benefit in quality of life of a multidimensional nature, specially in the emotional aspect, a fact that have already been observed, and that is related to the increase in self-esteem and the decrease in self-awareness after otoplasty [2, 8, 9].

Although the results are mostly positive, it should be noted that 5.7% of the children and 7.5% of the parents denied benefits after the otoplasty. This fact is closely related to the highly subjective nature of the surgical indication and the assessment of its results. Therefore, it is important to identify predictors of favourable results, which will help the surgeon decide which patients will benefit most from otoplasty.

Of the factors studied, significant differences were found in relation to age, with patients over 10 years old reporting greater benefit after surgery. Currently, the debate on the best age to perform otoplasty is still open. Most surgeons and psychologists believe it should be performed from the age of 6, when the child demonstrates the maturity necessary to express concerns and request the procedure on their own [11]. Indeed, in view of the results of this study and those previously reported by Bermueller et al. [6], it appears that children ≤ 10 are less aware of the shape of their ears, being more satisfied with their appearance before surgery and experiencing less cosmetic improvement after surgery. In contrast, proponents of surgical correction at the preschool age (3–5 years old) argue for the need to prevent psychosocial problems resulting from protruding ears before the child is exposed to peer bullying, which, due to current socioeconomical trends, is occurring at increasingly younger ages [14, 15]. From the authors' point of view, considering prominent ears as an aesthetic defect that will inevitably lead to psychosocial problems is a mistake. In our opinion, the education, family, and school environment of the patient could, in some cases, avoid the impact of this aesthetic characteristic on the quality of life of the patient.

On the other hand, children with post-surgical recurrence had significantly lower scores in terms of parent-reported quality of life. However, the patient-reported aesthetic benefit was not significantly lower in this group. This discrepancy could be explained by the results of Bermueller et al. [6], who found that children who have already undergone otoplasty rated the appearance of their ears better before surgery than those who have not undergone previous surgery.

Other aspects analysed, despite not reaching statistical significance, show interesting results to be considered at the time of surgical indication. For example, the results tend to be better in patients in whom the concha cartilage was resected, perhaps because children with high projection of the concha have a more evident defect that is more likely to affect their self-image and quality of life. The same occurs in patients with a bilateral defect, in which achieving symmetry is usually technically simpler, and in females, who are usually exposed to greater social pressure to achieve the ideal of beauty.

This study has a number of limitations. As it is a retrospective analysis, its results are exposed to possible memory biases. Furthermore, although instructions established that parents should not influence the child's response, the surveys were answered electronically, so the authors cannot guarantee compliance with these guidelines.

Conclusions

Otoplasty has a clear positive impact on the quality of life of children with prominent ears and their satisfaction with the appearance of their ears. Age at the time of surgery appears to be a predictor of post-surgical results. In contrast to the publications that defend otoplasty in patients under 5 years of age, the results of this

study would justify delaying the surgery until the age of 10, when the child is aware of the shape of their ears and can freely express their desire to undergo surgery. Finally, more prospective studies are needed to provide further evidence about possible predictors of positive outcomes following otoplasty.

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Authors' contributions
All authors have participated in the design and writing of this manuscript.

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Availability of data and materials
The datasets generated and/or analysed during the current study are not publicly available due to being derived from confidential medical records and anonymous questionnaires but are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate
The data used in this study has been treated anonymously and used with the consent of the patient's legal guardian.

Competing interests
The authors declare that they have no competing interests.

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