

Long-term changes in oral health-related quality of life of standard, cleft, and surgery patients after orthodontic treatment: A longitudinal study

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Introduction: The aim of this study was to assess long-term changes and describe the trajectories of oral health-related quality of life (OHRQoL) in a cohort of cleft, surgery, and standard patients who received orthodontic treatment. **Methods:** Standard ($n = 16$), cleft ($n = 19$), and orthognathic surgery ($n = 22$) patients completed the short-form of the Oral Health Impact Profile (OHIP-14) before treatment, immediately posttreatment, and approximately 5 years posttreatment. **Results:** An overall reduction in OHIP-14 scores (improvement in OHRQoL) occurred after orthodontic treatment; however, this was only significant for the surgery and standard groups ($P < 0.05$). The total OHIP-14 score increased significantly from posttreatment to 5 years follow-up for all 3 study groups ($P < 0.05$). Relative to pretreatment, however, there were significant reductions in total OHIP-14 scores at 5 years posttreatment in the surgery group (-57.4% ; $P < 0.05$), but not in the standard sample (-24.2% ; $P > 0.05$). By contrast, the OHIP-14 score in the cleft group increased but not significantly (40.2% ; $P > 0.05$). Using a mixed model analysis, a significant interaction was detected between patient group and time (ie, study time point) ($F = 6.0$; $P < 0.0001$), after adjusting for age and sex. **Conclusions:** Distinct patient groups showed different OHRQoL trajectories after orthodontic treatment. Treatment-related improvements in OHRQoL are maintained over time for surgery patients, but not for those with standard malocclusions and orofacial clefts. (*Am J Orthod Dentofacial Orthop* 2018;153:224-31)

Malocclusions are reported to have some impact on perceived attractiveness, social acceptance, and even intelligence.^{1,2} Functional problems may also occur in patients with dentofacial deformities.^{1,3} The collective impact of malocclusions on psychosocial well-being and physical functioning has largely been assessed with self-report instruments designed to measure oral health-related quality of life (OHRQoL). Previous research using these measures has identified a distinctive gradient in OHRQoL scores across

categories of malocclusion severity, especially in the social and emotional domains.⁴

Although orthodontic treatment may improve OHRQoL in many patients, the extent of this improvement seems to vary among patient groups with similar malocclusion severity.⁵ Patients with orofacial clefting have particularly complex malocclusions with both esthetic and functional impairments; yet, most report little change in general quality of life and OHRQoL after treatment.^{5,6} By comparison, noncleft patients treated with orthognathic surgery report highly significant improvements despite also having severe malocclusions and dentofacial deformities.^{5,7-9} Several factors may contribute to such differences in self-reported outcomes, including patients' clinical, environmental, and socioeconomic characteristics.¹⁰

Short-term changes in OHRQoL, however, may not fully reflect the perceived effects of treatment among orthodontic patients, since some factors (eg, the patient's underlying concerns) are liable to change during the person's lifetime. In patients with cleft lip and palate, for instance, concerns with facial esthetics may become

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All authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest, and none were reported.

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Submitted, December 2016; revised and accepted, June 2017.

0889-5406/\$36.00

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<https://doi.org/10.1016/j.ajodo.2017.06.018>

more evident during the stages of life that coincide with important social interactions, such as peer contact, employment, and marriage.^{11,12} The dynamic nature of these factors raises 2 important questions. What are the long-term changes in OHRQoL of orthodontically treated patients? How do they compare among different patient groups over time?

Few studies have investigated the long-term impact of orthodontic treatment on psychological well-being and OHRQoL. Not surprisingly, many of these longitudinal studies have either suffered from significant sample attrition at follow-up,¹³ or included short or unspecified recall periods.¹⁴⁻¹⁶ In spite of these inherent methodologic problems, sustained improvements in general quality of life and OHRQoL have been demonstrated in patients up to 5 years after orthognathic surgery.¹⁷ It is unclear, however, whether similar long-term treatment effects are found in other patient groups—ie, those with severe orthodontic malocclusions and cleft lip and palate. The longitudinal evaluation of OHRQoL in patients with cleft lip and palate is particularly important because of their multidisciplinary treatment that normally extends from birth to adulthood. During this time, age-related changes in facial growth may alter a cleft patient's perception of facial appearance, oral function, and, ultimately, quality of life. Recently, the need for longitudinal data on treated patients with severe dentofacial deformities and orofacial clefting has been highlighted in 2 systematic reviews.^{18,19}

Since treatment success ultimately depends on sustained improvements in both clinical and patient-centered outcomes, it is important that these parameters are audited over extended periods of time. Accordingly, the main objective of this follow-up study was to investigate long-term trajectories of OHRQoL in a cohort of cleft, surgery, and standard patients who received comprehensive orthodontic treatment. A secondary objective was to evaluate perceived attractiveness and need for further treatment at follow-up. We hypothesized that the 3 study groups would have distinctive trajectory profiles that may be influenced by perceived attractiveness and need for further treatment.

MATERIAL AND METHODS

Of the original 83 patients enrolled in a previous study, 57 agreed to participate in this follow-up study (response rate, 68.6%).²⁰ All 57 patients received comprehensive treatment at Christchurch Hospital in New Zealand. Details of the treatment delivered and the inclusion and exclusion criteria used to select the study sample have been described previously.⁵ The study was

reviewed and approved by the Human Ethics Committee (reference number HD14/58) of the University of Otago.

Study participants were classified as (1) standard patients with severe malocclusions ($n = 16$; 28.1%), (2) patients with nonsyndromic orofacial clefts requiring orthodontic treatment as part of their multidisciplinary management ($n = 19$; 33.3%), and (3) patients with underlying skeletal jaw discrepancies requiring orthodontic treatment and orthognathic surgery ($n = 22$; 38.6%).

Participants were contacted by phone and invited to complete a short survey, either online or using a paper-based form. The questionnaire included items relating to demographics, the short form of the Oral Health Impact Profile (OHIP-14), and perceived facial attractiveness and need for further treatment. Information about socioeconomic status was collected using a commonly used area-based measure in New Zealand.²¹ Movie vouchers were offered as an incentive for completing the survey.

The OHIP-14 was used to measure OHRQoL. This self-report instrument consists of 14 items organized into 7 domains that relate to function, pain, physical disability, psychological disability, social disability, psychological discomfort, and handicap.²² Study participants were asked to complete the OHIP-14 based on their experiences over the previous 4 weeks. They reported the impact for each item using a 5-point Likert-type scale (4, very often; 3, fairly often; 2, occasionally; 1, hardly ever; and, 0, never). A subject's overall score could range from 0 to 56, with domain scores from 0 to 8. A higher OHIP-14 score indicated a greater impact on OHRQoL.

Perceived attractiveness of the nose, lips, and face was assessed using a 100-mm visual analog scale (VAS), anchored by "not attractive" and "very attractive." VAS scores were also used to assess whether participants perceived a need for further treatment to change the appearance of their nose, lips, and face.

The severity of the malocclusions in the 3 study groups was assessed using the Dental Aesthetic Index. It is a common epidemiologic instrument that evaluates 10 occlusal characteristics: missing anterior teeth, crowding and spacing in the incisal region, midline diastema, maxillary and mandibular overjet, anterior open bite, maxillary and mandibular incisor irregularity, and molar relationship.²³ The overall Dental Aesthetic Index score is calculated by adding the scores of these 10 weighted components and summing with a constant of 13.²⁴ Accordingly, the severity of a malocclusion can be classified into 1 of 4 categories: normal or minor malocclusion (15-25), definite malocclusion (26-31), severe malocclusion (32-35), or handicapping malocclusion (>36).²⁵

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