



UNIVERSIDADE FEDERAL DE UBERLÂNDIA  
FACULDADE DE ODONTOLOGIA



TADEU FRANCISCO PRADELA

## **Effects of Ectodermal Dysplasia on children quality of life related to oral health**

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## **Effects of Ectodermal Dysplasia on children quality of life related to oral health**

Trabalho de conclusão de curso  
apresentado a Faculdade de  
Odontologia da UFU, como requisito  
parcial para obtenção do título de  
Graduado em Odontologia

Orientadora: Prof<sup>a</sup>. Dr<sup>a</sup>. Danielly Cunha  
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2017



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**TRABALHO DE CONCLUSÃO DE CURSO**

ATA DA COMISSÃO JULGADORA DA DEFESA DE TRABALHO DE CONCLUSÃO DE CURSO DO (A) DISCENTE **Tadeu Francisco Pradela** DA FACULDADE DE ODONTOLOGIA DA UNIVERSIDADE FEDERAL DE UBERLÂNDIA.

No dia seis de julho de 2017, reuniu-se a Comissão Julgadora aprovada pelo Colegiado de Graduação da Faculdade de Odontologia da Universidade Federal de Uberlândia, para o julgamento do Trabalho de Conclusão de Curso apresentado pelo (a) aluno (a) **Tadeu Francisco Pradela, COM O TÍTULO: "EFFECTS OF ECTODERMAL DYSPLASIA ON QUALITY OF LIFE RELATED TO ORAL HEALTH"**. O julgamento do trabalho foi realizado em sessão pública compreendendo a exposição, seguida de arguição pelos examinadores. Encerrada a arguição, cada examinador, em sessão secreta, exarou o seu parecer. A Comissão Julgadora, após análise do Trabalho, verificou que o mesmo encontra-se em condições de ser incorporado ao banco de Trabalhos de Conclusão de Curso desta Faculdade. O competente diploma será expedido após cumprimento dos demais requisitos, conforme as normas da Graduação, legislação e regulamentação da UFU. Nada mais havendo a tratar foram encerrados os trabalhos e lavrada a presente ata, que após lida e achada conforme, foi assinada pela Banca Examinadora.

Uberlândia, 06 de julho de 2017

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**Title:** Effects of Ectodermal Dysplasia on children quality of life related to oral health.

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## **Abstract**

**Background.** Ectodermal Dysplasia (ED) is an inherited condition that affects structures derived from the ectoderm. The most common form is hypohidrotic ectodermal dysplasia (DEH), in which cranial changes, hypohydrosis, hypotrichosis, oligodontia or anodontia, shape anomalies, delayed eruption of permanent teeth, deficiency in alveolar process development and enamel hypoplasias are observed.

**Case Report.** Two children, both 6 years old, one male and other female diagnosed with DEH received oral rehabilitation through reanatomization with composite resin of the anterior teeth and removable partial dentures. The quality of life before and after oral rehabilitation was evaluated through *Early Childhood Oral Health Impact Scale* (B-ECOHIS).

**Conclusion.** ED is an alteration that may have an impact on oral health related to quality of life due to its oral manifestations. The rehabilitation treatment was satisfactory in both patients.

**Key words:** Ectodermal Dysplasia; quality of life; child; mouth rehabilitation

## Introduction

The Ectodermal Dysplasia (ED) is a heterogeneous group of congenital hereditary disorders characterized by certain shared structural and functional abnormalities in tissues derived from the ectoderm<sup>1</sup>. There are different types of dysplasia, but the most frequently encountered dysplasia is ectodermal dysplasia 1, an X-linked hypohidrotic form (HED), also known as Christ-Siemens-Touraine Syndrome<sup>2</sup>. The ED has an incidence of 7 cases per 10,000 births<sup>3</sup>.

The main clinical features are hypotrichosis, inability to sweat, reduction on number and function of the endocrine glands and in oral aspects, a complete or partial anodontia, alterations in the teeth shape, in which the incisors and canines can present a conoid shape and the molars may present taurodontism<sup>4</sup>. Due to the clinical and oral manifestations, ED can physically and emotionally affect patients with this alteration<sup>3</sup>. The purpose of this study was to compare the oral health-related quality of life (OHRQoL) before and after complete oral rehabilitation through *Early Childhood Oral Health Impact Scale* (B-ECOHIS).

## Case Report

Both patients, 6 years old, diagnosed with HED, with partial anodontia were present at Pediatric Clinic. The mothers of each one of the patients answered the B-ECOHIS, a questionnaire to assess the quality of life at pre-school age, before and after oral rehabilitation of their children (Table 1).

### *Patient 1*

A 6-year-old, white, male, whose major complaint was that he has suffered bullying at school due to lack of teeth. Intraoral examination revealed the presence of 8 teeth, # 55, 51, 61, 65, 75, 73, 83 and 85. The anterior teeth presented the conoid shape and the posterior teeth undeveloped crowns. The tooth 51 suffered a dental trauma, there was alteration of color, pulp necrosis and fistula. Radical endodontic treatment was performed using the calcium hydroxide technique<sup>5</sup>. The reanatomization of the conoid teeth # 51 and 61 was done with composite resin color A1 (3M from Brazil, Sumaré – São Paulo, Brazil), using polyvinyl chloride (PVC) preformed matrix (TDV Dental Ltda, Pomerode- Santa Catarina, Brazil ). Subsequently, the child was rehabilitated with a pair of upper and lower removable partial prosthesis (Figures 1A, B, C, D, E, F, G).

#### *Patient 2*

A 6-year-old white female with major complaint that the mother would like her daughter's aesthetic to be improved. Intraoral examination revealed the presence of 7 teeth, # 55, 53, 51, 61, 63, 65 and 83. The anterior teeth presented the conoid shape and the posterior teeth the normal format. It was performed the reanatomization of the conoid teeth # 53, 51, 61 and 63 with composite resin color A1 (3M from Brazil, Sumaré – São Paulo, Brazil) using polyvinyl chloride (PVC) preformed matrix (TDV Dental Ltda, Pomerode –Santa Catarina, Brazil). The child was then rehabilitated with a pair of removable upper and lower partial prosthesis, but due to low bone remaining of the lower ridge and the presence of only one lower tooth for support the child had difficulty using the lower prosthesis (Figure 2A , B, C, D, E, F).

## Discussion

Due to the various manifestations found, it is evident that these alterations can have a direct impact on the child's quality of life, because it is a disorder with aesthetic and functional effects. Therefore, the dental approach in order to fully rehabilitate these patients is extremely valid and must be performed to allow a good physical and psychological development of the child.

The literature suggests that prosthetic rehabilitation occurs early, at the age of 2-3 years, using partial or total prostheses, to improve oral function and social interaction<sup>4</sup>. Another study suggests the early rehabilitation of young patients, justifying the improvement in social interaction, restoration of speech function and mastication<sup>3</sup>. Although early rehabilitation is suggested, it is necessary to verify the plans regarding the child's maturity and acceptance of the treatment. In both cases, the demand for oral rehabilitation occurred at 6 years of age, due to the difficulty in school socialization, but patient 1 had greater difficulties accepting treatment than patient 2.

The family considered the acceptance of the proposed treatment satisfactory. The patients' quality of life was altered, being verified by the scores obtained in the evaluation with B-ECOHIS. However, there was no immediate improvement in the quality of life related to oral health, since the evaluation was performed only with 7 days of use of the prosthesis, requiring a longer time to familiarize with the device. Previous study evaluating the quality of life of a patient with ED rehabilitated with prostheses, observed a significant improvement in quality of life only six months of use of the device<sup>3</sup>. Despite difficulties encountered in the use of prostheses, the same providing improvement in immediate esthetics.

**Why this case report is important to pediatric dentists:**

- ED cases are rare and the oral manifestations presented are very shocking, in this report we were able to describe two cases of this alteration in patients of different sexes.
- In the present report we had the opportunity to accompany the patients with this alteration in an early manner and were able to verify one of the treatment possibilities for these patients.
- Possibility to evaluate and verification of the quality of life of these patients before and after oral rehabilitation.

**Author contributions**

Mr. Pradela is an graduate student, responsible for the care of patients and writing of the manuscript (E-mail: [tpradela@hotmail.com](mailto:tpradela@hotmail.com)). Mr. Resende is an PhD student, collaborated with the protection and accompanying of patients (E-mail: [caioc\\_dias@hotmail.com](mailto:caioc_dias@hotmail.com)). Dr. Alcantara is an assistant professor, collaborated with the analysis and follow-up of the possible disorders in craniofacial growth and development (E-mail: [ronan.alcantara@ufu.br](mailto:ronan.alcantara@ufu.br)). Dr. Castro is an assistant professor, collaborated with the care of patients, photographic records of cases 1 and 2 and correction of the manuscript (E-mail: [alessandramaiacp@ufu.br](mailto:alessandramaiacp@ufu.br)). Dr. Oliveira is an associate professor, collaborated with the care of patients, photographic records and correction of the manuscript (E-mail: [fabianasodre@ufu.br](mailto:fabianasodre@ufu.br)). Dr. Ferreira is an assistant professor, responsible for the care of patients, photographic records and writing of the manuscript (E-mail: [danielly@ufu.br](mailto:danielly@ufu.br)).

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## Figure Legends

**Figure 1.** **A** and **B.** The frontal and lateral profile of the patient is observed hypotrichosis. **C.** Clinical intraoral exam verifying the presence of conoid teeth and absence of deciduous teeth. **D.** Radiographic examination verifying partial anodontia of deciduous and permanent teeth. **E.** Final radiographic examination highlighting the root canal obturation of tooth 51. **F.** Reanatomization of anterior teeth. **G.** Rehabilitation of missing teeth with removable partial dentures.

**Figure 2.** **A** and **B.** The frontal and lateral profile of the patient is observed hypotrichosis. **C.** Clinical intraoral exam verifying the presence of conoid teeth and absence of deciduous teeth. **D.** Radiographic examination verifying the almost total anodontia of deciduous and permanent teeth in the lower arch and partial anodontia in the upper arch. **E.** Reanatomization of upper anterior teeth and rehabilitation of missing teeth with removable partial dentures. **F.** Final smile of the child after receiving the superior prosthesis.

**Table 1.** Evaluation of quality of life before and after oral rehabilitation

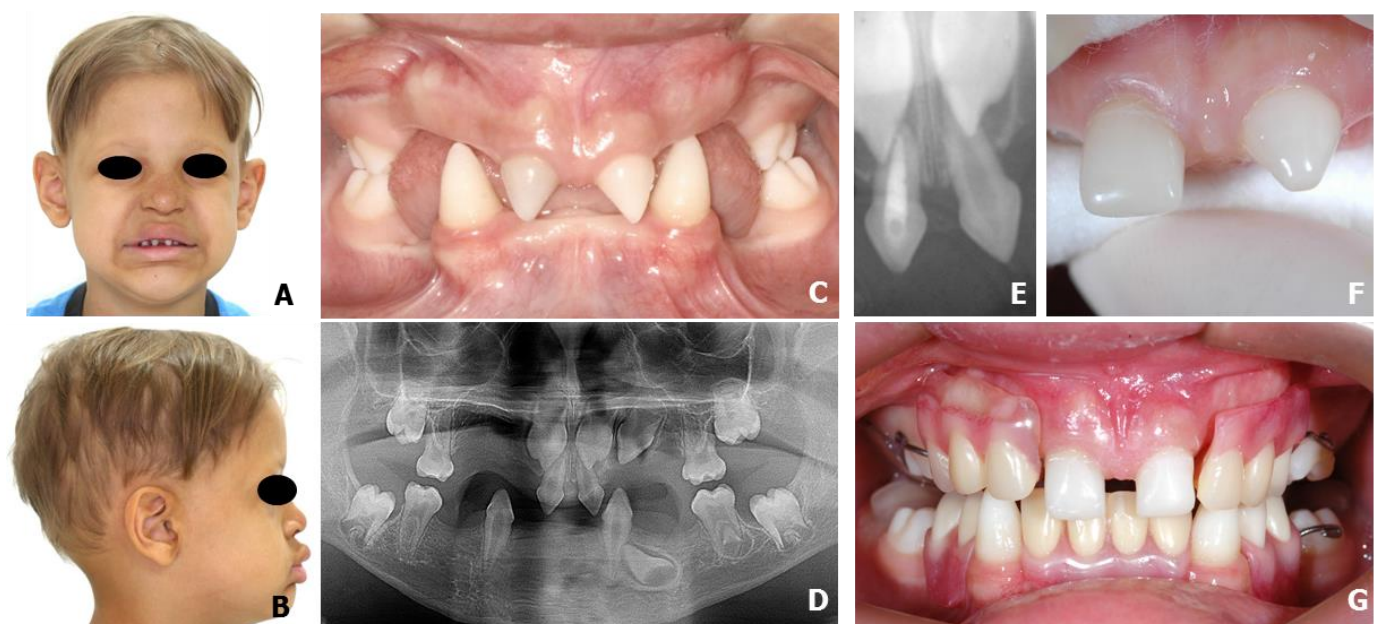
**Figure 1**

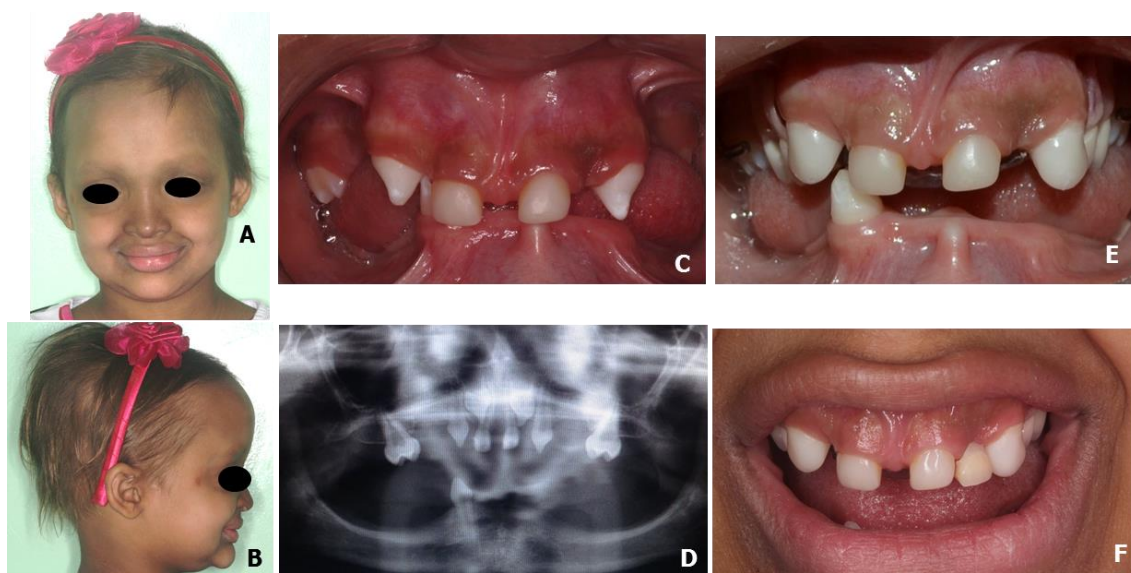
**Figure 2**

**Table 1.** Evaluation of quality of life before and after oral rehabilitation

| Domains                                             | Patient 1 |              |               | Patient 2 |              |               |
|-----------------------------------------------------|-----------|--------------|---------------|-----------|--------------|---------------|
|                                                     | Before    | After 7 days | After 30 days | Before    | After 7 days | After 30 days |
| Child had pain in the teeth, mouth, or jaw          | 2         | 1            | 1             | 1         | 3            | 1             |
| Child had difficulty drinking hot or cold beverages | 1         | 1            | 1             | 1         | 1            | 1             |
| Child had difficulty eating certain foods           | 1         | 4            | 1             | 3         | 4            | 2             |
| Child had difficulty pronouncing some words         | 4         | 4            | 4             | 1         | 1            | 1             |
| Child missed daycare, kindergarten, or school       | 1         | 4            | 1             | 1         | 1            | 1             |
| Child has stopped doing some daily activity         | 1         | 1            | 1             | 1         | 1            | 1             |
| Child had difficulty sleeping                       | 1         | 1            | 1             | 1         | 1            | 1             |
| Child became angry                                  | 3         | 3            | 1             | 1         | 3            | 1             |
| Child avoided smiling                               | 3         | 3            | 1             | 1         | 1            | 1             |
| Child avoided talking                               | 1         | 3            | 1             | 1         | 1            | 1             |
| Caregiver became upset                              | 1         | 1            | 1             | 1         | 1            | 1             |
| Caregiver felt guilty                               | 1         | 1            | 1             | 1         | 1            | 1             |
| Caregiver missed work                               | 1         | 1            | 1             | 2         | 2            | 1             |
| Caregiver felt the financial impact on the family   | 1         | 1            | 1             | 1         | 1            | 1             |
| <b>Total B-ECOHIS score</b>                         | <b>22</b> | <b>29</b>    | <b>17</b>     | <b>17</b> | <b>22</b>    | <b>15</b>     |

## **Appendix A**

### **International Journal of Paediatric Dentistry**

#### **Author Guidelines**

Content of Author Guidelines: 1. General, 2. Ethical Guidelines, 3. Manuscript Submission Procedure, 4. Manuscript Types Accepted, 5. Manuscript Format and Structure, 6. After Acceptance.

Relevant Documents: Sample Manuscript

Useful Websites: Submission Site, Articles published in International Journal of Paediatric Dentistry, Author Services, Wiley-Blackwell's Ethical Guidelines, Guidelines for Figures.

#### **CrossCheck**

The journal to which you are submitting your manuscript employs a plagiarism detection system. By submitting your manuscript to this journal you accept that your manuscript may be screened for plagiarism against previously published works.

#### **1. GENERAL**

International Journal of Paediatric Dentistry publishes papers on all aspects of paediatric dentistry including: growth and development, behaviour management, prevention, restorative treatment and issue relating to medically compromised children or those with disabilities. This peer-reviewed journal features scientific articles, reviews, clinical techniques, brief clinical reports, short communications and abstracts of current paediatric dental research. Analytical studies with a scientific novelty value are preferred to descriptive studies.

Please read the instructions below carefully for details on the submission of manuscripts, the journal's requirements and standards as well as information concerning the procedure after acceptance of a manuscript for publication in International Journal of Paediatric Dentistry. Authors are encouraged to visit

Wiley-Blackwell Author Services for further information on the preparation and submission of articles and figures.

In June 2007, the Editors gave a presentation on How to write a successful paper for the International Journal of Paediatric Dentistry.

## **2. ETHICAL GUIDELINES**

Submission is considered on the conditions that papers are previously unpublished, and are not offered simultaneously elsewhere; that authors have read and approved the content, and all authors have also declared all competing interests; and that the work complies with the Ethical Policies of the Journal and has been conducted under internationally accepted ethical standards after relevant ethical review.

## **3. CONFLICT OF INTEREST AND SOURCE FUNDING**

Journal of Oral Rehabilitation requires that all authors (both the corresponding author and co-authors) disclose any potential sources of conflict of interest. Any interest or relationship, financial or otherwise that might be perceived as influencing an author's objectivity is considered a potential source of conflict of interest. These must be disclosed when directly relevant or indirectly related to the work that the authors describe in their manuscript. Potential sources of conflict of interest include but are not limited to patent or stock ownership, membership of a company board of directors, membership of an advisory board or committee for a company, and consultancy for or receipt of speaker's fees from a company. If authors are unsure whether a past or present affiliation or relationship should be disclosed in the manuscript, please contact the editorial office at [IJPDedoffice@wiley.com](mailto:IJPDedoffice@wiley.com). The existence of a conflict of interest does not preclude publication in this journal.

The above policies are in accordance with the Uniform Requirements for Manuscripts Submitted to Biomedical Journals produced by the International Committee of Medical Journal Editors (<http://www.icmje.org/>). It is the responsibility of the corresponding author to have all authors of a manuscript fill out a conflict of interest disclosure form, and to upload all forms together with the manuscript on submission. The disclosure statement should be included

under Acknowledgements. Please find the form below: Conflict of Interest Disclosure Form

#### **4. MANUSCRIPT SUBMISSION PROCEDURE**

Articles for the International Journal of Paediatric Dentistry should be submitted electronically via an online submission site. Full instructions and support are available on the site and a user ID and password can be obtained on the first visit. Support is available by phone (+1 434 817 2040 ext. 167) or here. If you cannot submit online, please contact Mirlyn Consador in the Editorial Office by e-mail [IJPDedoffice@wiley.com](mailto:IJPDedoffice@wiley.com).

##### **4.1. Getting Started**

Launch your web browser (supported browsers include Internet Explorer 5.5 or higher, Safari 1.2.4, or Firefox 1.0.4 or higher) and go to the journal's online submission site: <http://mc.manuscriptcentral.com/ijpd>

\*Log-in or, if you are a new user, click on 'register here'.

\*If you are registering as a new user.

- After clicking on 'Create Account', enter your name and e-mail information and click 'Next'. Your e-mail information is very important.

- Enter your institution and address information as appropriate, and then click 'Next.'

- Enter a user ID and password of your choice (we recommend using your e-mail address as your user ID), and then select your area of expertise. Click 'Finish'.

\*If you are already registered, but have forgotten your log in details, enter your e-mail address under 'Password Help'. The system will send you an automatic user ID and a new temporary password.

\*Log-in and select 'Author Center'.

## 4.2. Submitting Your Manuscript

After you have logged into your 'Author Center', submit your manuscript by clicking on the submission link under 'Author Resources'.

\* Enter data and answer questions as appropriate.

\* You may copy and paste directly from your manuscript and you may upload your pre-prepared covering letter. Please note that a separate Title Page must be submitted as part of the submission process as 'Title Page' and should contain the following:

- Word count (excluding tables)
- Authors' names, professional and academic qualifications, positions and places of work. They must all have actively contributed to the overall design and execution of the study/paper and should be listed in order of importance of their contribution
- Corresponding author address, and telephone and fax numbers and email address

\*Click the 'Next' button on each screen to save your work and advance to the next screen.

\*You are required to upload your files.

- Click on the 'Browse' button and locate the file on your computer.
- Select the designation of each file in the drop down next to the Browse button.
- When you have selected all files you wish to upload, click the 'Upload Files' button.

\* Review your submission (in HTML and PDF format) before completing your submission by sending it to the Journal. Click the 'Submit' button when you are finished reviewing.

## 4.3. Manuscript Files Accepted

Manuscripts should be uploaded as Word (.doc) or Rich Text Format (.rtf) files (not write-protected) plus separate figure files. GIF, JPEG, PICT or Bitmap files are acceptable for submission, but only high-resolution TIF or EPS files are suitable for printing. The files will be automatically converted to HTML and a PDF document on upload and will be used for the review process. The text file must contain the entire manuscript including title page, abstract, text, references, tables, and figure legends, but no embedded figures. In the text, please reference figures as for instance 'Figure 1', 'Figure 2' to match the tag name you choose for the individual figure files uploaded. Manuscripts should be formatted as described in the Author Guidelines below. Please note that any manuscripts uploaded as Word 2007 (.docx) is now accepted by IPD. As such manuscripts can be submitted in both .doc and .docx file types.

#### 4.4. Review Process

The review process is entirely electronic-based and therefore facilitates faster reviewing of manuscripts. Manuscripts will be reviewed by experts in the field (generally two reviewers), and the Editor-in-Chief makes a final decision. The International Journal of Paediatric Dentistry aims to forward reviewers' comments and to inform the corresponding author of the result of the review process. Manuscripts will be considered for 'fast-track publication' under special circumstances after consultation with the Editor-in-Chief.

#### 4.5. Suggest a Reviewer

International Journal of Paediatric Dentistry attempts to keep the review process as short as possible to enable rapid publication of new scientific data. In order to facilitate this process, please suggest the names and current email addresses of a potential international reviewer whom you consider capable of reviewing your manuscript and their area of expertise. In addition to your choice the journal editor will choose one or two reviewers as well.

#### 4.6. Suspension of Submission Mid-way in the Submission Process

You may suspend a submission at any phase before clicking the 'Submit' button and save it to submit later. The manuscript can then be located under

'Unsubmitted Manuscripts' and you can click on 'Continue Submission' to continue your submission when you choose to.

#### 4.7. E-mail Confirmation of Submission

After submission you will receive an e-mail to confirm receipt of your manuscript. If you do not receive the confirmation e-mail after 24 hours, please check your e-mail address carefully in the system. If the e-mail address is correct please contact your IT department. The error may be caused by some sort of spam filtering on your e-mail server. Also, the e-mails should be received if the IT department adds our e-mail server ([uranus.scholarone.com](mailto:uranus.scholarone.com)) to their whitelist.

#### 4.8. Manuscript Status

You can access ScholarOne Manuscripts any time to check your 'Author Center' for the status of your manuscript. The Journal will inform you by e-mail once a decision has been made.

#### 4.9. Submission of Revised Manuscripts

Revised manuscripts must be uploaded within 2 months of authors being notified of conditional acceptance pending satisfactory revision. Locate your manuscript under 'Manuscripts with Decisions' and click on 'Submit a Revision' to submit your revised manuscript. Please remember to delete any old files uploaded when you upload your revised manuscript. All revisions must be accompanied by a cover letter to the editor. The letter must a) detail on a point-by-point basis the author's response to each of the referee's comments, and b) a revised manuscript highlighting exactly what has been changed in the manuscript after revision.

#### 4.10 Online Open

OnlineOpen is available to authors of primary research articles who wish to make their article available to non-subscribers on publication, or whose funding agency requires grantees to archive the final version of their article. With OnlineOpen, the author, the author's funding agency, or the author's institution pays a fee to ensure that the article is made available to non-subscribers upon

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## **5. MANUSCRIPT TYPES ACCEPTED**

Original Articles: Divided into: Summary, Introduction, Material and methods, Results, Discussion, Bullet points, Acknowledgements, References, Figure legends, Tables and Figures arranged in this order. The summary should be structured using the following subheadings: Background, Hypothesis or Aim, Design, Results, and Conclusions and should be less than 200 words. A brief description, in bullet form, should be included at the end of the paper and should describe Why this paper is important to paediatric dentists.

Review Articles: may be invited by the Editor.

Short Communications: should contain important, new, definitive information of sufficient significance to warrant publication. They should not be divided into different parts and summaries are not required.

Clinical Techniques: This type of publication is best suited to describe significant improvements in clinical practice such as introduction of new technology or practical approaches to recognised clinical challenges.

Brief Clinical Reports/Case Reports: Short papers not exceeding 800 words, including a maximum of three illustrations and five references may be accepted for publication if they serve to promote communication between clinicians and researchers. If the paper describes a genetic disorder, the OMIM unique six-digit number should be provided for online cross reference (Online Mendelian Inheritance in Man).

A paper submitted as a Brief Clinical/Case Report should include the following:

- a short Introduction (avoid lengthy reviews of literature);
- the Case report itself (a brief description of the patient/s, presenting condition, any special investigations and outcomes);
- a Discussion which should highlight specific aspects of the case(s), explain/interpret the main findings and provide a scientific appraisal of any previously reported work in the field.

Please provide up to 3 bullet points for your manuscript under the heading: 1. Why this clinical report is important to paediatric dentists. Bullet points should be added to the end of your manuscript, before the references.

Letters to the Editor: Should be sent directly to the editor for consideration in the journal.

## **6. MANUSCRIPT FORMAT AND STRUCTURE**

### **6.1. Format**

Language: The language of publication is English. UK and US spelling are both acceptable but the spelling must be consistent within the manuscript. The journal's preferred choice is UK spelling. Authors for whom English is a second language must have their manuscript professionally edited by an English speaking person before submission to make sure the English is of high quality. It is preferred that manuscript is professionally edited. A list of independent suppliers of editing services can be found at [http://authorservices.wiley.com/bauthor/english\\_language.asp](http://authorservices.wiley.com/bauthor/english_language.asp). All services are paid for and arranged by the author, and use of one of these services does not guarantee acceptance or preference for publication

## 6.2. Structure

The whole manuscript should be double-spaced, paginated, and submitted in correct English. The beginning of each paragraph should be properly marked with an indent.

Original Articles (Research Articles): should normally be divided into: Summary, Introduction, Material and methods, Results, Discussion, Bullet points, Acknowledgements, References, Figure legends, Tables and Figures arranged in this order.

Please include a statement of author contributions, e.g. Author contributions: A.S. and K.J. conceived the ideas; K.J. and R.L.M. collected the data; R.L.M. and P.A.K. analysed the data; and A.S. and K.J. led the writing.

Summary should be structured using the following subheadings: Background, Hypothesis or Aim, Design, Results, and Conclusions.

Introduction should be brief and end with a statement of the aim of the study or hypotheses tested. Describe and cite only the most relevant earlier studies. Avoid presentation of an extensive review of the field.

Material and methods should be clearly described and provide enough detail so that the observations can be critically evaluated and, if necessary repeated. Use section subheadings in a logical order to title each category or method. Use this order also in the results section. Authors should have considered the ethical aspects of their research and should ensure that the project was approved by an appropriate ethical committee, which should be stated. Type of statistical analysis must be described clearly and carefully.

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Paulsson L, Bondemark L, Söderfeldt B. A systematic review of the consequences of premature birth on palatal morphology, dental occlusion, tooth-crown dimensions, and tooth maturity and eruption. *Angle Orthodontist* 2004; 74: 269-279.

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1. Kronfol NM. Perspectives on the health care system of the United Arab Emirates. *East Mediter Health J*. 1999; 5: 149-167.
2. Ministry of Health, Department of Planning. Annual Statistical Report. Abu Dhabi: Ministry of Health, 2001.

3. Al-Mughery AS, Attwood D, Blinkhorn A. Dental health of 5-year-old children in Abu Dhabi, United Arab Emirates. *Community Dent Oral Epidemiol* 1991; 19: 308-309.

4. Al-Hosani E, Rugg-Gunn A. Combination of low parental educational attainment and high parental income related to high caries experience in preschool children in Abu Dhabi. *Community Dent Oral Epidemiol* 1998; 26: 31-36.

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## Appendix D

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## Appendix E

