CLINICAL CASES SERIES

Clinical Cases in
Pediatric Dentistry

SECOND EDITION

Editor:

Amr M. Moursi, DDS, PhD

Professor and Chairman
Department of Pediatric Dentistry
New York University College of Dentistry
New York, NY
USA

Associate Editor:

Amy L. Truesdale, DDS

Clinical Assistant Professor
Department of Pediatric Dentistry
New York University College of Dentistry
New York, NY
USA

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Editorial Office
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CONTENTS

PREFACE

Welcome to the second edition of *Clinical Cases in Pediatric Dentistry*. The editors, chapter authors, and contributors have truly appreciated the enthusiastic response to our first edition.

The second edition maintains the original format enjoyed by so many readers. However, much has changed. All 66 cases have been comprehensively updated to include the latest diagnostic and treatment techniques. Also, the most current references to the literature, best practices, and evidence-based clinical guidelines have been added. Additionally, there are new cases in each of the chapters; a total of thirteen entirely new cases. These new additions include cases addressing patients with special health care needs such as the systemic and oral health management of children with attention deficit hyperactivity disorder, celiac disease, diabetes, and cleft lip and palate. Other additions address technologies and materials that have evolved, or become more established, since the first edition, such as silver diamine fluoride and zirconia esthetic crowns. Many of the new cases also illustrate a more conservative approach to caries management and pulp therapy. New, updated trauma treatment algorithms have also been added in the Orofacial Trauma chapter. For those using the book as a study guide, new and updated self-assessment questions have been added to all the cases.

We are delighted to have most of our original contributors returning to update their work and add new cases. We also have a number of new contributors whose fresh takes on the cases have been a wonderful addition. Also, most of the chapters and many of the cases have been re-sequenced in order to enhance readability and improve the flow of the content.

As noted in the first edition, the scope of pediatric dentistry continues to evolve to include all aspects of wellness that may influence oral and craniofacial health. Likewise, the education of pediatric dentistry has also evolved to include case-based teaching to reinforce better this more holistic approach. Traditional textbooks are a wonderful resource but by necessity present information in artificially constrained topic groupings. Pediatric dentistry is a discipline where a whole host of issues need to be addressed simultaneously in order to properly make a diagnosis and manage a patient's care. A case-based approach to education allows one to apply foundational knowledge, obtained from reference texts and didactic courses, to develop strategies for providing patient-centered care.

The clinical cases included in this book were conceived to provide case studies for a wide array of learning situations. Predoctoral students can use the cases as they are introduced to pediatric dentistry and as a study guide for case-based curricula and exams. Postdoctoral students and residents can use these cases as they prepare for case-based exams during their training and for board certification. This book will also be a useful tool for educators who will now have a ready collection of clinical cases, covering the essentials of pediatric dentistry, to discuss with their students.

Each case emphasizes a particular topic. Each topic contains one or more **Fundamental Points**, which are highlighted in designated blue boxes within the text. Fundamental Points address issues that are of importance to the diagnosis, treatment plan, and management of the case. Each case also has one or more areas of **Background Information**, designated in orange boxes. Issues addressed in Background Information

may include a more in-depth discussion of a particularly important element of the topic that may not necessarily be fully illustrated in the case history.

To use this book as a study guide, we recommend that the reader initially read only the information provided on patient presentation and history, then determine what additional diagnostic information is necessary and how it would be best obtained. After reading the diagnostic information provided, the reader should then compile a differential diagnosis and problem list. This can then be compared with those provided in the case. Following this, a treatment plan can be proposed which should then be compared with that listed in the text. Questions and answers are also listed for each case. These can be used to review the key elements of the topic or as a study guide for self-evaluation in preparation for written or oral exams.

Although each clinical case in this book was designed to focus on a distinct oral health issue, we also intend for each case to stand alone. Therefore, the reader will encounter some repetition from case to case. The editors have tried to minimize this as much as possible but it will be evident particularly in the areas of history gathering and the discussion of best practices, clinical guidelines, and prevention recommendations.

We have selected contributors with an international perspective in order to make the content universally relevant. However, for consistency we have chosen to use US nomenclature and when referring to clinical guidelines we have, primarily, used the guidelines of the American Academy of Pediatric Dentistry (AAPD), which can be freely accessed online at: aapd.org/media/policies.asp.

The chapter topics have been selected to represent the essentials of pediatric dentistry. However, as with all books, there are some limitations. The cases were not meant to comprise an exhaustive survey of pediatric oral disorders. Rather, it was our intention that they represent the 'bread and butter' of our discipline. It was also beyond the scope of this type of book to provide comprehensive citations, which can be found in other reference texts, but we have listed a few key references for each case.

We hope that students, educators, and clinicians will find this new edition a useful resource as we continue to advance and broaden the scope of pediatric oral health care.

ACKNOWLEDGMENTS

The editors would like to thank all the chapter authors and case contributors for compiling such wonderful clinical cases for this second edition.

We would also like to thank those who contributed to the first edition. Their work laid the foundation on which this second edition was built. In particular, special thanks go to first edition Associate Editor, Dr. Marcio A. da Fonseca, for his tireless efforts in bringing the book to its original inception. To the right is a full list of first edition contributors. In addition, special thanks go to those who helped, in countless ways to create this book, from inception to completion: Ms. Alana Grambush, Ms. Yan Zhao, Ms. Cindy Hansen, Dr. Courtney Chinn, Dr. Amanda Alon, Ms. Sophia Joyce, Ms. Erica Judisch, and Ms. Purvi Patel.

On a personal note, I would like to thank my associate editor, Dr. Amy Truesdale, for her long hours and perseverance. Also, I am deeply indebted to Dr. Serena Kassam for contributing her expertise and editorial content. Thanks also go to all the faculty, students, and residents of the NYU Department of Pediatric Dentistry. My deepest gratitude goes to Mary and Cleo for their sacrifice, patience, and understanding, without which this book would not exist.

And finally, we are all indebted to the many children, and their parents, who agreed to appear in this book.

Amr M. Moursi

Contributors to the first edition:

Associate Editor

Marcio A. da Fonseca, DDS, MS

Chapter Authors

Paul Casamassimo, DDS, MS
Diane L. Howell, CRNA, MSNA
Dennis J. McTigue, DDS, MS

Case Contributors

Omolola Adetona, DDS
Etty Dayan, DMD
Zvia Elazary, DMD
Maria Minerva Garcia, DDS
Ilana Heling, DMD, MSc
Timothy B. Henson. DMD
Royana Lin, DDS
Jeffrey C. Mabry, DDS, MS
Hugo A. Rivera, DDS, MEd
Farhad Yeroshalmi, DMD

LIST OF CONTRIBUTORS

Editor

Amr M. Moursi, DDS, PhD, Professor and Chairman, Department of Pediatric Dentistry, New York University College of Dentistry, New York, NY, USA

Associate Editor

Amy L. Truesdale, DDS, Clinical Assistant Professor, Department of Pediatric Dentistry, New York University College of Dentistry, New York, NY, USA

Contributors

Farah Alam, DDS, Director, Special Care Dentistry, Montefiore Medical Center, Bronx, NY, USA

Homa Amini, DDS, MPH, MS, Clinical Professor of Pediatric Dentistry, College of Dentistry, The Ohio State University, Columbus, OH, USA

Richard Balmer, FDS (Paed Dent), RCPS (Glasgow), PhD, Consultant and Lecturer in Paediatric Dentistry, University of Leeds, Leeds, United Kingdom

James R. Boynton, DDS, MS, Clinical Associate Professor and Pediatric Dentistry Division Head, School of Dentistry, University of Michigan, Ann Arbor, MI, USA

Angus C. Cameron, BDS, MDSc, FRACDS, FDSRCS(Eng), FICD, Clinical Associate Professor, Paediatric Dentistry, The University of Sydney, Sydney, Australia

Lina M. Cárdenas, DDS, MS, PhD, Adjunct Clinical Professor, Department of Developmental Dentistry, School of Dentistry, University of Texas Health, San Antonio, TX, USA

Claudia I. Contreras, DDS, Assistant Professor/Clinical, Department of Developmental Dentistry, School of Dentistry, University of Texas Health, San Antonio, TX, USA

Jennifer Cully, DMD MEd, Assistant Professor, Cincinnati Children's Hospital, Cincinnati, OH, USA

Jeffrey A. Dean, DDS, MSD, FRSCI (Hon), Ralph E. McDonald Professor of Pediatric Dentistry and Professor of Orthodontics, Indiana University School of Dentistry, Indianapolis, IN, USA

Kevin J. Donly, DDS, MS, Professor and Chair, Department of Developmental Dentistry, School of Dentistry, University of Texas Health, San Antonio, TX, USA

Nancy Dougherty, DMD, MPH, Clinical Associate Professor, Department of Pediatric Dentistry, New York University College of Dentistry, New York, NY, USA

Kirsten FitzGerald, BDentSc, MS, FFD (RCSI), Consultant Paediatric Dental Surgeon, Children's Health Ireland at Crumlin, Dublin Dental University Hospital, Trinity College, Dublin, Ireland

Paddy Fleming, BDentSc, FDS, MS, FFD, Consultant and Associate Professor in Paediatric Dentistry, Children's Health Ireland at Crumlin, Dublin Dental University Hospital, Trinity College, Dublin, Ireland

Anna B. Fuks, DMD, Professor Emeritus, Department of Pediatric Dentistry, Hadassah School of Dental Medicine, Hebrew University, Jerusalem, Israel

Sam Gue, BDS, MDSc, FRACDS, Associate Professor and Head, Department of Paediatric Dentistry, University of Adelaide, Adelaide, South Australia, Australia

Tasha E. Hall, DMD, MSD, Adjunct Clinical Assistant Professor, Orthodontics and Oral Facial Genetics, Indiana University School of Dentistry, Indianapolis, IN, USA

Kerrod B. Hallett, MDSc, MPH, FRACDS, FICD, Clinical Associate Professor and Director of Dentistry, Royal Children's Hospital, University of Melbourne, Melbourne, Victoria, Australia

Luna Matar Khoury, DMD, Pediatric Dentistry Resident, Department of Pediatric Dentistry, Hadassah School of Dental Medicine, Hebrew University, Jerusalem, Israel

Ron Kosinski, DMD, Clinical Associate Professor, Department of Pediatric Dentistry, New York University College of Dentistry, New York, NY, USA

Jungyi Alexis Liu, DDS, MS, Assistant Professor/ Clinical, Department of Developmental Dentistry, School of Dentistry, University of Texas Health, San Antonio, TX, USA

Evelyn Mamber, DMD, Clinical Coordinator and Instructor, Department of Pediatric Dentistry, Hadassah School of Dental Medicine, Hebrew University, Jerusalem, Israel

Eleanor McGovern, BDS, MFD, MDentCh (Paediatric Dentistry), Consultant in Paediatric Dentistry, Children's Health Ireland at Temple Street, Dublin, Ireland

Dennis J. McTigue, DDS, MS, Professor Emeritus, College of Dentistry, The Ohio State University, Columbus, OH, USA

Moti Moskovitz, DMD, PhD, Postgraduate Program Director and Clinical Senior Lecturer, Department of Pediatric Dentistry, Hadassah School of Dental Medicine, Hebrew University, Jerusalem, Israel

Sheena Nandi, DDS Adjunct Clinical Assistant Professor, Department of Pediatric Dentistry, New York University College of Dentistry, New York, NY, USA

Eyal Nuni, DMD, Clinical Associate Professor, Department of Endodontics, Hadassah School of Dental Medicine, Hebrew University, Jerusalem, Israel

Diana Ram, DMD, Department Chair and Clinical Associate Professor, Department of Pediatric Dentistry, Hadassah School of Dental Medicine, Hebrew University, Jerusalem, Israel

Qamar Saadi, DMD, Pediatric Dentistry Resident, Department of Pediatric Dentistry, Hadassah School of Dental Medicine, Hebrew University, Jerusalem, Israel

Dena Sapanaro, DDS, Clinical Assistant Professor, Department of Pediatric Dentistry, New York University College of Dentistry, New York, NY, USA

Barbara Sheller, DDS, MSD, Affiliate Professor, Department of Orthodontics, Department of Pediatric Dentistry, University of Washington, Seattle Children's Hospital, Seattle, WA, USA

Iris Slutzky-Goldberg, DMD, Clinical Associate Professor and Postgraduate Program Director, Department of Endodontics, Hadassah School of Dental Medicine, Hebrew University, Jerusalem, Israel

S. Thikkurissy, DDS, MS, Professor and Robert Creedon Chief of Dentistry, Cincinnati Children's Hospital, Cincinnati, OH, USA

Denise A. Trochesset, DDS, Clinical Professor and Chair, Department of Oral and Maxillofacial Pathology, Radiology and Medicine, New York University College of Dentistry, New York, NY, USA

LaQuia A. Vinson, DDS, MPH, Associate Professor of Pediatric Dentistry, Indiana University School of Dentistry, Indianapolis, IN, USA

Michael D. Webb, DDS, MEd, Chair and Clinical Associate Professor, Department of Pediatric Dentistry, Orthodontics and Dentofacial Orthopedics, East Carolina University School of Dental Medicine, Greenville, NC, USA

1

Early Childhood Oral Health

Homa Amini

Clinical Cases in Pediatric Dentistry, Second Edition. Edited by Amr M. Moursi.

Companion website: www.wiley.com/go/moursi/pediatrics

CHAPTER 1

Case 1

Perinatal Oral Pathology

Figure 1.1.1 Intraoral photograph showing anterior mandibular natal teeth.

A. Presenting Patient

- Seven-day-old male
- Consultative visit requested by neonatologist

B. Chief Complaint

- Neonatologist requests "evaluation of what appear to be teeth erupting on bottom jaw"

FUNDAMENTAL POINT 1

Obtaining a History

- Obtain a thorough history of the pregnancy and birth
- Obtain a thorough understanding of the child's natal teeth, including when first observed, associated complications with ventilator tubing, or infections (Cunha et al. 2001; Amini and Casamassimo 2010)

C. Social History

- First child
- Twenty-one-year-old single, immigrant mother
- Qualified for public assistance

D. Medical History

- Born two weeks prematurely
- On ventilator for two days
- Currently in pediatric intensive care unit

E. Medical Consult

- Not applicable

F. Dental History

- Teeth present at birth

G. Extraoral Exam

- Head misshapen
- Sparse hair

FUNDAMENTAL POINT 2

Clinical Exam: Significance of Findings

- Determine if the teeth present a problem for nursing due to irritation of child or mother. Also determine the potential risk of aspiration if teeth are mobile
- If removal is contemplated, consider radiographic examination to determine whether teeth are supernumerary or prematurely erupting teeth of the primary dentition

H. Intraoral Exam

- Edentulous maxillary arch
- High maxillary frenum
- Palate intact
- Mandibular arch with teeth in the mandibular left central incisor and mandibular right central incisor positions, partially erupted, brownish in color, rotated and firm to manipulation (Figure 1.1.1)

BACKGROUND INFORMATION 1

Natal and Neonatal Teeth

- Teeth can be present at birth (natal teeth) or erupt within the first 30 days after birth (neonatal teeth)
- Most natal teeth are members of the normal complement of primary teeth
- Most natal teeth appear in the mandibular anterior region
- Natal teeth may be associated with other disorders, usually those involving the skin, bones, or ectoderm, such as chondroectodermal dysplasia. Therefore, careful systemic evaluation of children with natal teeth is necessary (Moura et al. 2014)

I. Diagnostic Tools

- Occlusal radiograph of mandibular anterior region if deemed necessary (Figure 1.1.2)

J. Differential Diagnosis

- Other congenital neonatal pathology including: Bohn's nodules, Epstein's pearls, and other retention phenomena

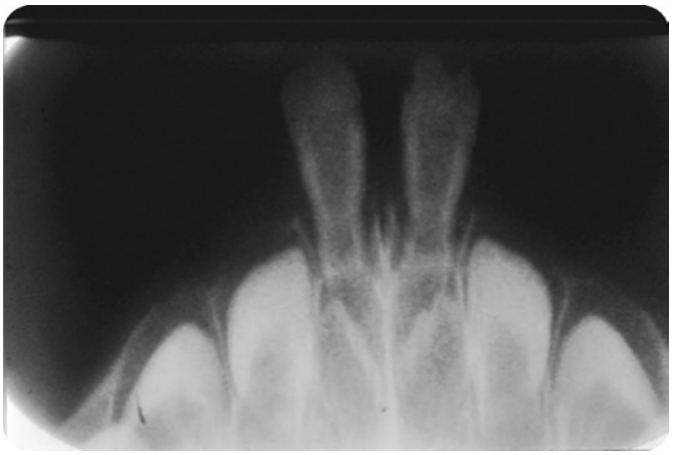


Figure 1.1.2 Mandibular occlusal radiograph showing natal teeth.

K. Diagnosis and Problem List

Diagnosis

- Natal teeth

Problem List

- Potential for nursing difficulty
- Potential for aspiration
- Potential for traumatic ulcer of the ventral surface of the tongue known as Riga–Fede disease (Figure 1.1.3)
- Potential for trauma to the mucosa of the opposing arch

L. Treatment Plan

- Observe for mobility, ulcerations, and nursing difficulty
- Extraction as indicated

M. Prognosis and Discussion

- No literature describes the risk of aspiration of natal teeth, so removal should be based primarily on the appearance, firmness, and likelihood of function of the tooth
- In the event the tooth is a member of the normal complement of primary teeth, parents should be made aware that the loss might result in alteration of spacing and alignment of the remaining primary teeth

N. Complications and Alternative Treatment Plan

- If the infant presents with a ventral tongue ulceration or the mother presents with an ulceration on the breast, incisal edge recontouring can be considered
- The child's vitamin K status should be determined prior to extraction within the first 10 days of life. Intramuscular administration of vitamin K at birth can reduce the risk of bleeding

Figure 1.1.3 Traumatic ulcer (arrow) on the ventral surface of the tongue.

Case 2

First Dental Visit, Healthy Child

Figure 1.2.1 (A) Knee-to-knee exam; (B) extraoral exam; (C) intraoral exam.

A. Presenting Patient

- Twelve-month-old African-American female

B. Chief Complaint

- Mother reports, "My pediatrician said I needed to bring her in for her first dental check-up"

C. Social History

- Lives with parents and two older siblings
- Mother is primary caregiver

D. Medical History

- Review of systems: normal
- History of well-child visits and immunizations up to date in medical home

E. Medical Consult

- Not applicable

F. Dental History

- First dental visit
- No toothbrushing performed at this time
- Fluoridated water supply is main source of drinking water
- Uses pacifier intermittently
- Still drinks from bottle for meals and snacks, but not freely

G. Extraoral Exam

- Head, neck, and facial features normal
- Height and weight at 60th percentile
- Child marginally cooperative for knee-to-knee examination (Figure 1.2.1a,b)

H. Intraoral Exam (Figure 1.2.1c)

- Soft tissues healthy
- Eight teeth present, developmentally within normal range for age but with crowding
- Plaque on teeth

H. Intraoral Exam

- Use knee-to-knee exam position to examine infant (Figure 1.3.1)
- Intraoral soft tissues normal with minor gingivitis
- Primary teeth present and with normal eruption for age
- Plaque on teeth with areas of cervical decalcification (Figure 1.3.2)
- Incisal edges rounded (Figure 1.3.2)
- No cavitation noted

FUNDAMENTAL POINT 3

Intraoral Exam in Infant Oral Health

- The knee-to-knee exam position is ideal for infants. It allows for good patient stabilization and excellent visualization by both the provider and the parent
- Plaque on teeth at this age and the surrogate measure of gingivitis are strong predictors of future dental caries (Alaluusua and Malmivirta 1994)
- Loss of anatomical definition is one indicator of dental erosion and at this age should be a warning sign (Barron et al. 2003)
- Oral erythema and gingivitis also may accompany GERD (Barron et al. 2003)
- Instruct parent on methods of oral hygiene with attention to frequency and use of a "smear" of fluoridated dentifrice
- Include recommendation for next recall visit to determine compliance and outcomes of preventive anticipatory guidance and progress of erosion

Figure 1.3.2 Intraoral photograph showing cervical decalcification.

I. Diagnostic Tools

- Caries Risk Assessment Tool
- Fluoride assessment of drinking water

FUNDAMENTAL POINT 4

Assessment Tools in Infant Oral Health

- Caries risk: use the AAPD Caries Risk Assessment Tool in assigning a patient's risk category: http://www.aapd.org/media/Policies_Guidelines/BP_CariesRiskAssessment.pdf
- Fluoride assessment and prescribing: use the AAPD Guideline on Fluoride Therapy to determine amount and vehicle: http://www.aapd.org/media/Policies_Guidelines/BP_FluorideTherapy.pdf

J. Differential Diagnosis

- Not applicable

K. Diagnosis and Problem List

Diagnosis

- Normally developing child, with age appropriate oral development
- GERD
- High risk for dental caries

Problem List

- Still feeding from bottle, including at bedtime
- Indeterminate fluoride status
- No oral hygiene being practiced
- Dental erosion from GERD

L. Comprehensive Treatment Plan

- Provide parents with alternatives to bottle use and ways to eliminate sleeping with the bottle at night
- Perform an assessment of the fluoride content of the family's main source of drinking water and prescribe supplementation as needed

I. Diagnostic Tools

- Radiographs: maxillary periapical or occlusal (Figure 1.5.3)
- Caries Risk Assessment Tool

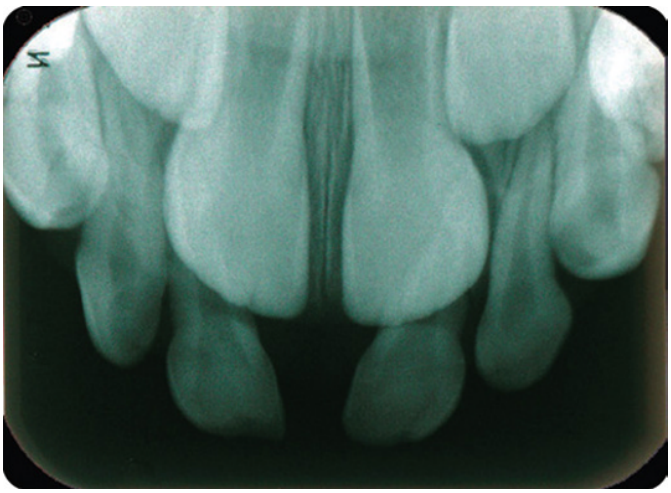


Figure 1.5.3 Maxillary periapical radiograph.

J. Differential Diagnosis

- Not applicable

K. Diagnosis and Problem List

Diagnosis

- Dental caries involving dentin on maxillary right lateral, right central, and left central incisors

Problem List

- Infrequent oral hygiene
- Free access to sippy cup containing juice
- Inability to cooperate for outpatient definitive dental restorations

L. Comprehensive Treatment Plan

- Oral hygiene instruction using brushing with smear of fluoridated dentifrice
- Dietary analysis and counseling with attention to sugar and frequency control
- Caries removal and restoration using interim therapeutic restoration (ITR) and glass ionomer cement (GIC)
- Recall interval of three months to assess outcomes and reinforce caries protective factors
- Behavior guidance using parent-assisted immobilization
- Application of fluoride varnish to teeth

FUNDAMENTAL POINT 1

Treatment Planning for Interim Therapeutic Restorations

- Carious lesions suited for ITR should be confined to dentin with sound enamel margins and no pulpal involvement
- ITR has the greatest success when applied to single surface or small two surface lesions

(American Academy of Pediatric Dentistry [AAPD] 2018–2019a,b)

M. Postoperative Intraoral Photographs

- Note tooth-colored ITR in Figure 1.5.4

Figure 1.5.4 Postoperative intraoral photograph showing completed treatment.

N. Prognosis and Discussion

- Oral hygiene should occur twice daily, once in the morning after breakfast and once before bed. The procedure should be done at a time and in a place that fits comfortably into this family's lifestyle. A rice-size amount of fluoride dentifrice should be used when brushing for topical effect. No rinsing should follow brushing to allow retention of fluoride in the oral cavity (American Dental Association 2014)
- Juice should be virtually eliminated from the child's diet and other sources of sugar should be reduced. Children at this age should have no more than 6 ounces of juice per day, preferably at meal times

- Prevention plan:
  - Three-month recall, re-evaluate oral hygiene status and caries risk
  - Prescribe a remineralizing product such as those containing amorphous calcium phosphate

BACKGROUND INFORMATION 1

Class II Resin-Modified Glass Ionomer Cement Restoration

- A class II resin-modified GIC restoration can be very effective. Caries are removed with a 330 bur, creating a rectangular box preparation with the axial wall placed in dentin as far as caries extend. The preparation buccal and lingual walls slightly converge occlusally. A dovetail is placed from the proximal box of the preparation onto the occlusal surface. This provides a bulk of GIC which is less susceptible to fracture than just a slot preparation, in which only the proximal box is prepared and restored with restorative material. It is important to place butt cavosurface margins due to the brittleness and compressive strength of resin-modified GIC
- A resin primer can be placed prior to the resin-modified GIC to improve bond strength to tooth structure. Following placement of the GIC restoration, the tooth should be isolated as best as is possible so that saliva does not wash away aluminum during the acid-base chemical cure. This allows for maximum uptake of aluminum, which maximizes compressive strength
- After the restoration is finished and polished, a resin adhesive should be placed over the restoration surface. Again, this allows the aluminum that has not been taken up into the glass ionomer setting reaction to remain at the restoration surface for uptake as the reaction continues over 24 hours

(AAPD 2002; Burgess et al. 2002; Donly and Garcia-Godoy 2002; Waggoner and Nelson 2019)

M. Treatment (Figures 2.2.4–2.2.7)

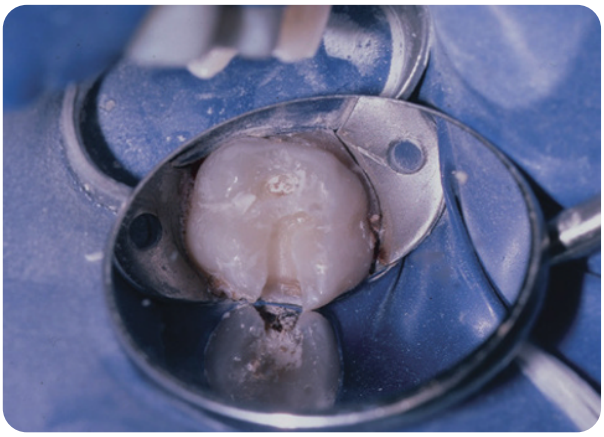


Figure 2.2.4 Isolated maxillary left primary second molar with mesio-occlusal preparation, including occlusal dovetail.

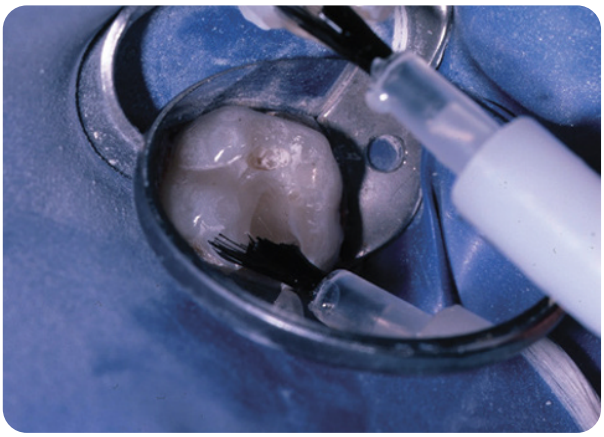


Figure 2.2.5 Primer applied.

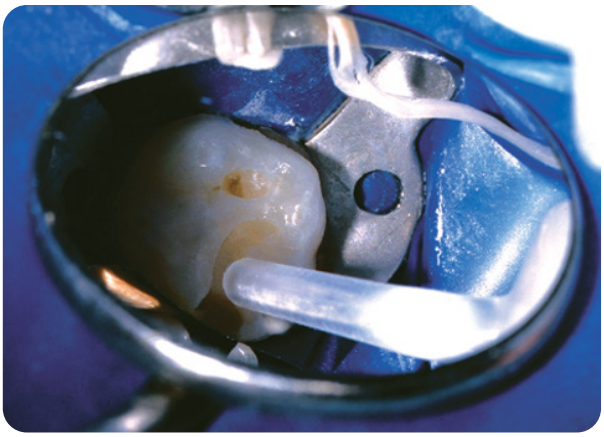


Figure 2.2.6 Resin-modified glass ionomer cement applied.

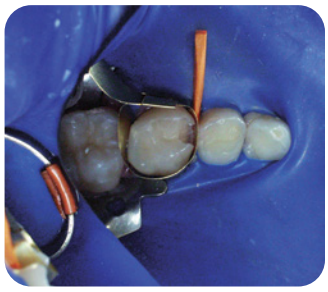


Figure 2.3.4 Cavity preparation and matrix placement.

Figure 2.3.5 Etch with phosphoric acid.

Figure 2.3.6 Placement of dentinal bonding agent.

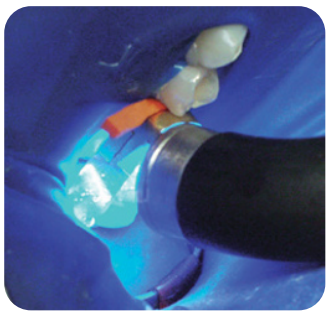


Figure 2.3.7 Light curing of resin restoration.

- Apply a dentinal bonding agent, carefully following manufacturer's instructions (Figure 2.3.6)
- Apply resin composite material in increments, preferably no more than 2 mm of composite at a time. Incremental curing of the composite reduces polymerization shrinkage and ensures maximum polymerization (Figure 2.3.7)

Figure 2.3.8 Finishing of resin restoration.

Figure 2.3.9 Final restoration.

Finishing

- A finishing carbide bur may be used to adapt the occlusal anatomy, if needed (Figure 2.3.8)
- Polishing can be completed with the use of enhancement points
- Use a sealant material to reduce occlusal wear and seal the restoration. The additional light curing will also help to obtain maximum polymerization of the resin restoration (Figure 2.3.9)

N. Prognosis and Discussion

- Ideally, a sealant on the maxillary right first permanent molar and a resin restoration on the maxillary right primary first molar would have also been provided during the same visit, but the patient's level of cooperation did not allow for further treatment
- In this case, a resin restoration was performed instead of a stainless steel crown, because of the small size of the lesion and the fair patient cooperation. This patient is considered a high caries risk. However, having effectively instilled the importance of oral hygiene, recall examinations, good diet, and establishment of a dental home for this patient, resin restorations were determined to be the treatment of choice (see Fundamental Points 1, 2 and 3)

O. Complications and Alternative Treatment Plan

- If the behavior of the patient would have been poor, making it difficult to isolate the tooth for a class II

Case 4

Class V Glass Ionomer Restoration

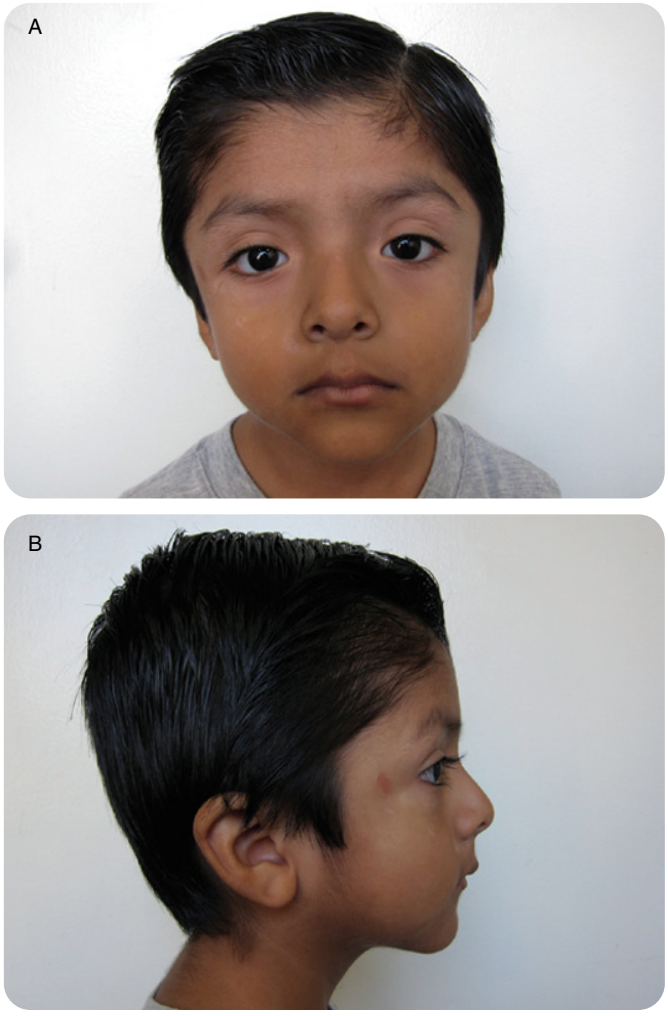


Figure 2.4.1 (A, B) Facial photographs.

A. Presenting Patient

- Three-year-, eight-month-old male (Figure 2.4.1)
- New patient dental examination

B. Chief Complaint

- Parent states, "I am concerned the stains on his front teeth may be cavities"

C. Social History

- Patient attends preschool
- Enjoys playing with his friends and younger sister
- Parents are married and both work

D. Medical History

- Not contributory

E. Medical Consult

- Not applicable

F. Dental History

- First dental visit
- Optimal water fluoridation levels (0.7 ppm)
- Brushes teeth by himself
- High cariogenic diet
- Parent does not expect patient to be cooperative

G. Extraoral Examination

- Within normal limits

H. Intraoral Examination (Figure 2.4.2)

- Moderate plaque accumulation
- Mild gingivitis

Figure 2.4.2 Preoperative photograph.

- Three-month recall:
  - Re-evaluate oral hygiene status and caries risk
- Restore decayed teeth (see Fundamental Point 4):
  - Maxillary left primary canine-facial decay: resin restoration
  - Maxillary right primary first molar-distal decay: stainless steel crown
  - Address apprehensive behavior: recommend use of nitrous oxide/oxygen
- Attempt to remineralize the incipient lesions with a remineralizing product such as those containing amorphous calcium phosphate:
  - Maxillary right primary second molar-mesial incipient lesion
  - Mandibular left primary second molar-mesial incipient lesion
  - Mandibular left primary first molar-distal incipient lesion
  - Mandibular right primary second molar-mesial incipient lesion

M. Treatment

- Treatment (see Background Information 1):
  - Local anesthesia: 36 mg of lidocaine with 1:100 000 epinephrine was administered
  - Rubber dam isolation: a clamp was placed on the maxillary left primary second molar to achieve isolation (Figures 2.5.5–2.5.8)
- Behavior management was achieved with nitrous oxide sedation and tell-show-do technique

Figure 2.5.5 Rubber dam isolation.

Figure 2.5.6 Placement of bonding agent.

Figure 2.5.7 Placement of resin.

Figure 2.5.8 Final restoration.

N. Prognosis and Discussion

- The prognosis for future caries is poor due to the patient's moderate cariogenic diet and poor oral hygiene. Prognosis could be improved with implementation of the proposed prevention plan. Efforts should be made to reduce the patient's anxiety, to wean off the nitrous oxide, and establish a comfort level with dental care

FUNDAMENTAL POINT 3

Fluoride Varnish

- Due to the patient's high caries risk and young age, fluoride varnish was placed. Fluoride varnish may be substituted for the traditional topical fluoride treatment for the caries-active preschooler. Varnish may be applied after the prophylaxis and may be flossed through tight contacts (Soxman 2005). It is easily applied and enhances remineralization. Three-yearly applications of fluoride varnish have been used effectively for children under the age of five (Featherstone 2006)

Figure 2.6.3 Anterior periapical radiograph.

J. Differential Diagnosis

- Not applicable

K. Diagnosis and Problem List

Diagnosis

- Faulty margins on sealants on maxillary permanent molars and mandibular right permanent first molar
- Uncomplicated, crown fracture on the maxillary left permanent central incisor involving the mesial, incisal, facial, and lingual (MIFL) surfaces (more than one year ago)

Problem List

- Marginal defects on sealants on maxillary permanent first molars and mandibular right permanent first molar
- Uncomplicated, crown fracture of the maxillary left permanent central incisor MIFL
- Irregular dental home

L. Comprehensive Treatment Plan

- Establish a regular dental home
- Dental prophylaxis
- Fluoride treatment
- Review of oral hygiene (with parent and child)
- Re-seal maxillary permanent first molars and mandibular right permanent first molar
- Restore maxillary left permanent central incisor MIFL fracture with resin restorative material (Donly and García-Godoy 2015)
- Custom mouthguard to prevent further trauma because patient is involved in multiple contact sports (see Fundamental Point 3)
- Six-month recall: re-evaluate traumatized tooth number 9, re-evaluate oral hygiene status

M. Treatment (Figures 2.6.4–2.6.11)

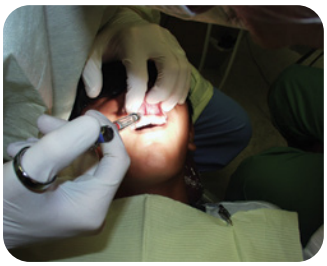


Figure 2.6.4 Administration of local anesthetic.

Figure 2.6.5 Preoperative view of the fractured maxillary permanent left central incisor.

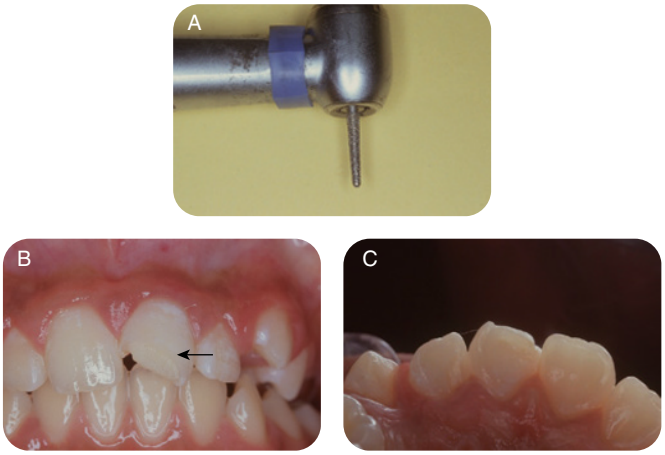


Figure 2.6.6 (A–C) Placement of a 1.5 mm chamfer (arrow) on the enamel margins with a number 1 DT diamond bur.

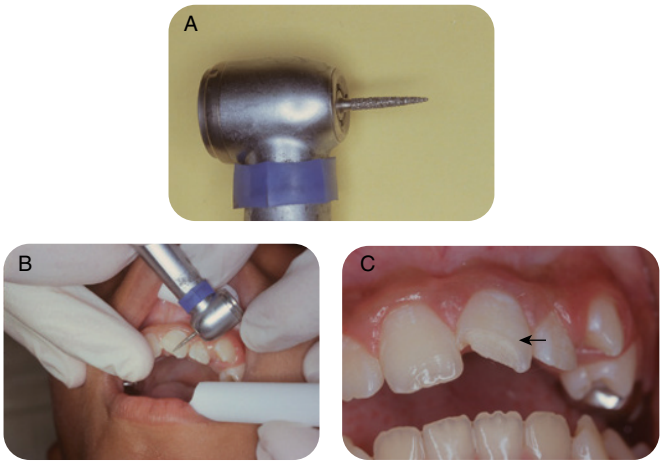


Figure 2.6.7 (A–C) Placement of a slight 1 mm bevel (arrow) on the chamfer with a number 1/8A diamond bur.

Figure 2.8.7 (A–C) Two-week postoperative photographs.

O. Common Complications and Alternative Treatment Plans

- An anterior crossbite could alter the plan to use anterior zirconia crowns
- Inability to control bleeding might affect the placement of zirconia crowns by interfering with adequate bonding from the cement and poor esthetics

FUNDAMENTAL POINT 2

Zirconia Crowns

- Zirconia is a type of bioceramic material used to make preformed biocompatible crowns that are very durable and esthetic
- Zirconia crowns have become popular because of the natural color option. Zirconia crowns were first introduced in 2010. They are available in various sizes and shades for anterior and posterior primary teeth:
  - Zirconia crowns require a feathered margin as in other crown preparations; however, these crowns require more tooth reduction when compared with strip crowns and stainless steel crowns (Clark et al. 2016)
  - Zirconia crowns require a passive fit and can only be placed without resistance. The ceramic crowns do not flex, so the tooth is prepared to fit the crowns rather than adjusting the crowns to fit a tooth
  - Unlike stainless steel crowns, zirconia crowns cannot be crimped. The retention is reliant on the different internal surface designs and cementation
  - Although more esthetic, the cost of zirconia crowns is higher than other types of crowns

FUNDAMENTAL POINT 3

Cementation for Zirconia Crowns

- Most of the manufacturers of zirconia crowns recommend glass ionomer cement or resin-modified glass ionomer cement
- A new BioActive cement (BioCem®, NuSmile Pediatric Crowns, Houston, Texas, USA) was introduced to cement zirconia crowns. BioCem forms hydroxyapatite to integrate into tooth structure and releases phosphate, calcium, and fluoride ions. BioCem is a dual cured resin-modified glass ionomer cement and provides a superior bond to zirconia surfaces (Waggoner 2015)
- Hemorrhage control is very important to prevent contamination of the crowns and achieve adequate bonding from cement
- Thorough cleaning of crowns with alcohol is necessary before cementation
- Try-in crowns allow for sizing. The actual crown can then be cemented free of contamination prior to cementation

Case 7

Root End Closure – Apexification With Calcium Hydroxide

Figure 3.7.1 Facial photograph.

A. Presenting Patient

- Ten-year-old female (Figure 3.7.1)

B. Chief Complaint and History of Present Injury

- The patient was referred by her dentist for root canal treatment (RCT) of the maxillary left permanent central incisor which was laterally luxated nine months ago when she fell off her bike
- History of treatment: at the initial appointment in the dental office, the tooth did not respond to sensitivity tests and a radiolucent area was observed at the periapex. It was then diagnosed as having asymptomatic apical periodontitis. A calcium hydroxide ($Ca(OH)_2$) dressing was placed in the canal and the access cavity was sealed with a temporary filling (intermediate restorative material; IRM)

C. Social History

- Third of five siblings
- Low to middle class family

D. Medical History

- Review of medical history revealed no significant findings, no known drug or food allergies, no medications, vaccinations up to date

E. Medical Consult

- Not applicable

F. Dental History

- Has a dental home
- Eats a regular balanced diet
- Good oral hygiene habits, brushes her teeth at least once a day, unsupervised
- Uses a fluoride-containing toothpaste
- Lives in an optimally fluoridated area
- Dental trauma nine months ago
- Cooperative

G. Extraoral Exam

- No significant findings

H. Intraoral Exam

Soft Tissues

- No significant findings

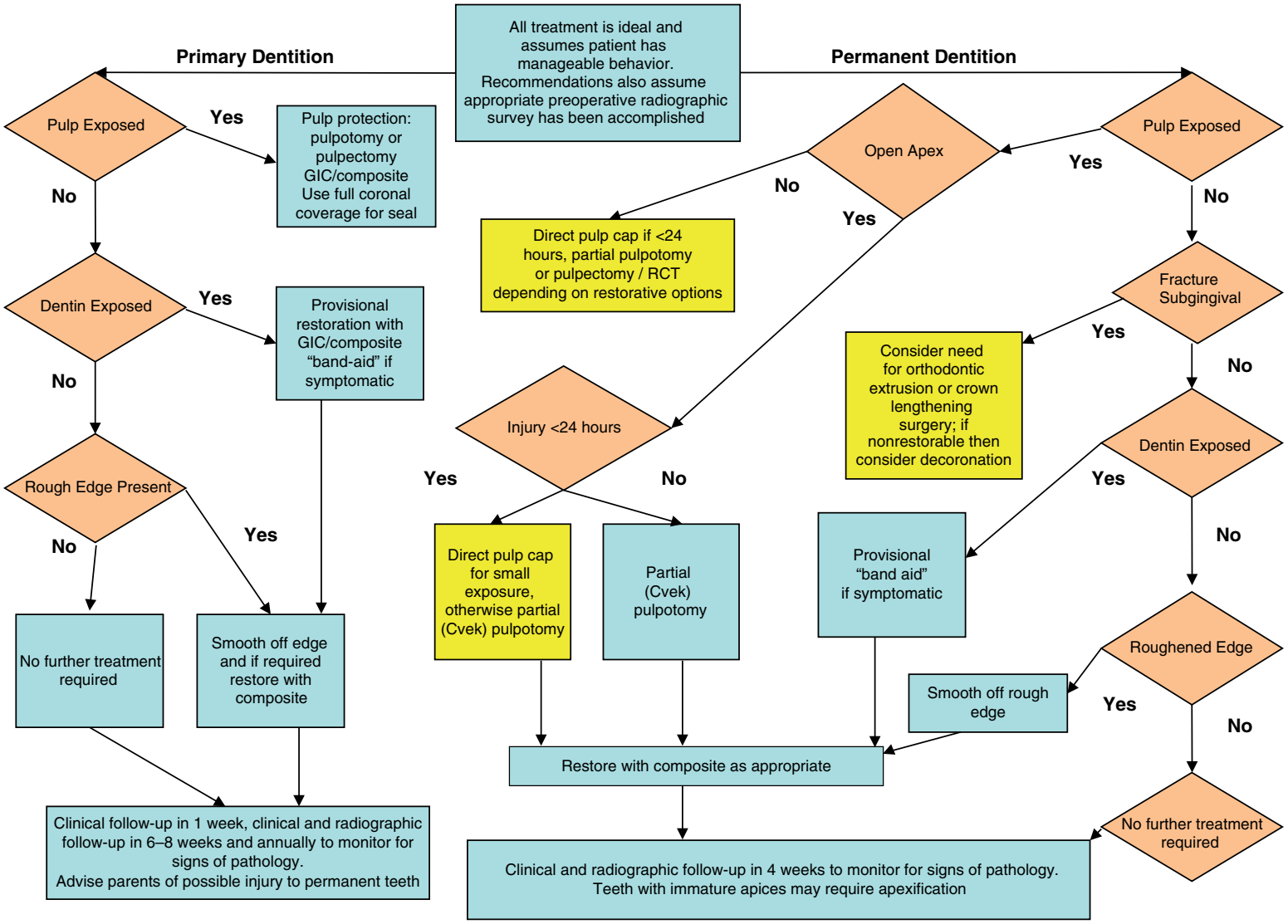
Hard Tissues

- No significant findings

Occlusal Evaluation of Mixed Dentition

- Class I molars, anterior crowding

Flowchart C: Crown Fracture Injuries



o GIC: Glass Ionomer Cement
o RCT: Root Canal Therapy

Anne O'Connell, Andrew Spading, Trauma and Sports Dentistry (Chapter 9), pg. 177–190. In: The Handbook of Pediatric Dentistry, AAPD, 5th Ed., Nowak and Casamassimo, 2018.
Trauma Treatment Algorithms, Chapter 9, Fig. 1-5, pg. 183–85

more than 12 hours and hence admission to the hospital may be required to manage dehydration

F. Dental History

- No dental home
- First visit to the dentist
- Cariogenic diet
- Brushes teeth with fluoridated toothpaste infrequently with some adult supervision
- Lives in an optimally fluoridated area
- No history of trauma

G. Extraoral Exam

- A thorough examination is extremely difficult due to the state of the child's health
- The child is generally unwell, lethargic, and irritable, with a temperature of 39 °C (102.2 °F)
- There is no extraoral swelling, but there is marked inflammation and ulceration of the lips and the lateral commissures. Numerous ulcers and open lesions around the lips and face are present (Figure 5.2.1)

H. Intraoral Exam

Soft Tissues (Figure 5.2.2)

- The gingival tissues are acutely inflamed with minor bleeding from the crevicular margin. There are multiple small ulcers, particularly on the dorsum of the tongue, and some areas of ulceration are noted on the attached gingiva. The hard palate, the fauces, and the pharynx are generally unaffected

Figure 5.2.2 Intraoral photograph showing gingival inflammation and mucosal ulcerations.

Hard Tissue and Occlusal Evaluation

- Deferred at this appointment

Other

- Generalized heavy plaque accumulation

I. Diagnostic Tools

- A swab of the affected tissues could be considered for exfoliative cytology
- Viral culture may be considered (may take many days to establish a result)
- Viral antibody detection

J. Differential Diagnosis

Infective: Viral Infection

- Primary herpetic gingivostomatitis
- Coxsackie viral infection: herpangina, and hand, foot and mouth disease
- Other viral infections: infectious mononucleosis (Epstein–Barr), varicella (chickenpox)

Immunological

- Autoimmune recurrent ulceration
- Erythema multiforme/Stevens–Johnson syndrome
- Behcet syndrome

Neoplasia

- Hematological malignancy

Inflammatory

- Orofacial granulomatosis

FUNDAMENTAL POINT 2

Presentation of Herpetic Lesions

- The presentation of a young child with a prodrome of one to two days of febrile illness followed by the development of an acute stomatitis is characteristic of primary herpes infection. Typically, vesicles are not seen because they form rapidly and break down to form coalesced areas of ulceration; however, the primary signs are those of acute gingival inflammation. Commonly, the child will present to their local medical practitioner, and antibiotics are frequently prescribed, inappropriately, in the absence of a definitive diagnosis. It is not until the appearance of the ulcers that the true diagnosis is apparent

FUNDAMENTAL POINT 2

Technique of Administration

- Avoid a large meal prior to administration to reduce risk of nausea and vomiting
- Select proper size nasal hood
- Flow rate of 5 to 6 l/min of combined nitrous oxide and oxygen. Check fail-safe valve which prevents flow if there is no oxygen (Rose and McLarney 2014) (Figure 6.3.3)
- Administer 100% O_2 for one to two minutes
- Begin titration of nitrous oxide increasing by 10% increments every three to four minutes
- Do not exceed 50%
- Maintain proper scavenging to reduce ambient levels (CDC 2014; AAPD 2018–2019b)
- During treatment, visual monitoring of patient's respiratory rate and level of consciousness
- Patient more compliant and open to suggestion
- Communicative techniques more effective with nitrous oxide/oxygen
- Once procedure is completed, 100% O_2 given for five minutes to avoid diffusion hypoxia (AAPD 2018–2019a)

Figure 6.3.3 Nitrous oxide/oxygen delivery unit. (A) Nitrous oxide (blue) and oxygen (green) tanks; (B) regulator.

FUNDAMENTAL POINT 1

Patient Assessment

- When reviewing the patient's medical history and performing an assessment of the patient's general health, keep in mind that the ASA uses a physical status classification system which serves as a risk assessment
- A careful pre-sedation evaluation for underlying health conditions that would place the patient at an increased risk for complications during sedation must be completed
- Only patients who are ASA I or II are routinely accepted as appropriate candidates for in-office moderate sedation
- Patients who are ASA III or IV, those with special needs, or those with airway abnormalities including tonsillar hypertrophy require individual consideration and may need further medical evaluation to determine if they are appropriate candidates for sedation
- Patients who are ASA III typically are treated in the hospital setting with anesthesiologists to manage potential complications (American Academy of Pediatric Dentistry [AAPD] 2018–2019)

ASA Physical Status Classification System

- Class I: normal healthy patient
- Class II: patient with mild systemic disease
- Class III: patient with severe systemic disease
- Class IV: patient with a severe systemic disease that is a constant threat to life
- Class V: moribund patient who is not expected to survive without the operation

H. Intraoral Exam

Soft Tissues

- Within normal limits, Brodsky scale +2 (See Fundamental Point 2)

Hard Tissues

- Multiple severe carious lesions

Dentition

- Primary dentition

Occlusion

- Crossbite on right posterior side

FUNDAMENTAL POINT 2

Patient Assessment: Brodsky Scale

- To help minimize the potential for airway obstruction in children receiving oral sedation medications, an airway assessment must be completed prior to sedation to check for airway abnormalities or large tonsils
- The Brodsky scale indicates how much space the tonsillar tissue occupies in the pharyngeal area
- Patients with a Brodsky of +3 (meaning the tonsillar tissue takes up more than 50% of the pharyngeal space) are at an increased risk of developing airway obstruction (see example in Figure 6.4.2)
- Patients with a Brodsky of +3 or greater should be considered for alternative pharmacologic management, i.e. general anesthesia or no sedation

(Brodsky 1989 and Saxon 2016)

Figure 6.4.2 Example of a patient with Brodsky of +3.

BACKGROUND INFORMATION 1

Airway Assessment

- Airway assessment is critical preoperatively in an effort to anticipate and prepare for any airway difficulties during mask ventilation or during tracheal intubation
- The Mallampati score assesses the degree to which the practitioner can visualize access to the airway including the size of the uvula during voluntary tongue protrusion. It is sometimes difficult to obtain on an uncooperative child (Figure 6.5.2)
- The Brodsky scale is used to evaluate the size of the tonsils and the degree to which they may obstruct the airway (Figure 6.5.2)
- Airway assessment also includes looking for mobile teeth, chipped/damaged teeth, mobile restorations or crowns, or oral appliances
- Prominent labial inclination of the maxillary incisors can make laryngoscopy difficult without damaging the incisors
- Other indicators of a potentially difficult mask ventilation or laryngoscopy and intubation include:
  - Micrognathia
  - Large tongue
  - Short neck
  - Limited cervical spine or temporomandibular jaw mobility

Figure 6.5.2 Example of visualization of access to the airway, including the uvula and tonsils, to determine the Mallampati score and Brodsky scale.

- Children with a high body mass index or obesity can have a difficult airway or upper airway obstruction in the postanesthesia care unit. They may also require longer postoperative recovery times and need more antiemetics
- Children with craniofacial abnormalities require a thorough preoperative airway evaluation and tools for a difficult airway should be immediately available

(Nafiu et al. 2007; Butterworth et al. 2013)

I. Diagnostic Tools

- Radiographs will be completed under sedation

J. Differential Diagnosis

- Not applicable

K. Diagnosis and Problem List

Diagnosis

- Severe early childhood caries
- Severe situational anxiety

Problem List

- English is not primary language, needs a competent translator (not a family member)
- Poor diet and oral hygiene
- No dental home

Figure 6.5.3 Sedated patient with nitrous oxide/oxygen, monitors and protective stabilization.