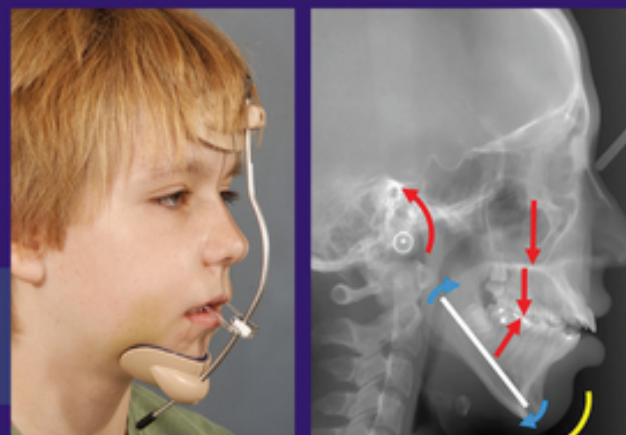
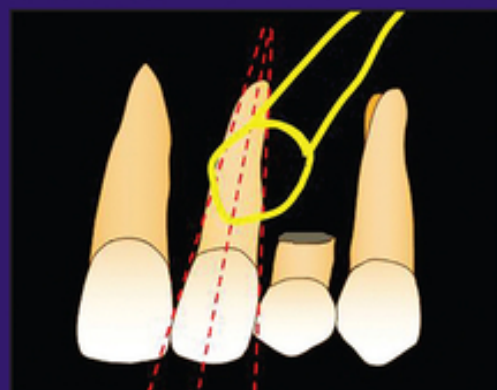


# Practical Early Orthodontic Treatment

A Case-Based Review



Thomas E. Southard  
Steven D. Marshall  
Laura L. Bonner  
Kyungsup Shin



WILEY Blackwell

# Table of Contents

[Cover](#)

[Title Page](#)

[Copyright Page](#)

[Preface](#)

[About the Companion Website](#)

[1 Foundations](#)

[General Principles](#)

[Growth and Development of the Craniofacial Complex](#)

[References](#)

[2 Crowding](#)

[Introduction](#)

[Case Jasmine](#)

[Case Bella](#)

[Case Evan](#)

[Case Amber](#)

[Case Kate](#)

[Case Dillon](#)

[Case Madison](#)

[Case Muriel](#)

[Case Mudathir](#)

[Case Lucas](#)

[Case Jeff](#)

[Case Kasandra](#)

[Case Clair](#)

[References](#)

### 3 Eruption Problems

Introduction

Case Brody

Case Rebecca

Case Alicia

Case Trista

Case Melissa

Case Cara

Case Easton

Case Katie

Case Erin

Case Brian

References

### 4 Anteroposterior Problems

Introduction

Case Jake

Case Alexandra

Case Mark

Case Cory

Case Mason

Case Edward

Case Cooper

Case Allison

Case Nathan

Case Carlie

References

### 5 Vertical Problems

Introduction

[Case Lynnear](#)

[Case Sydney](#)

[Case Ned](#)

[Case Anna](#)

[Case Emily](#)

[Case Gabby](#)

[Case Carter](#)

[Case Tricia](#)

[Case Nora](#)

[Case Mara](#)

[References](#)

## [6 Transverse Problems](#)

[Introduction](#)

[Case Jasmin](#)

[Case Jenna](#)

[Case Jonathan](#)

[Case Alaina](#)

[Case Halee](#)

[References](#)

## [Appendix](#)

[Cephalometrics Primer](#)

[Iowa AP Classification Primer](#)

[Tables for Reference](#)

[Abbreviations](#)

[References](#)

[Index](#)

[End User License Agreement](#)

# List of Tables

## Chapter 1

[Table 1.1 Diagnostic findings and problems list for Theo \(\*apical base/skele...\*](#)

[Table 1.2 Primary problems list for Theo \(\*apical base/skeletal discrepancie...\*](#)

[Table 1.3 Diagnostic findings and problem list for Jack.](#)

[Table 1.4 Primary problems list for Jack \*apical base/skeletal discrepancies...\*](#)

[Table 1.5 Primary problems list for Caden \*apical base/skeletal discrepancie...\*](#)

[Table 1.6 The timing of eruption and exfoliation of the primary Dentition<sup>a</sup>....](#)

[Table 1.7 Distribution \(%\) of mixed dentition molar interocclusal relations...](#)

## Chapter 2

[Table 2.1 Diagnostic findings and problem list for Emma.](#)

[Table 2.2 Diagnostic findings and problem list for Amelia.](#)

[Table 2.3 Primary problems list for Amelia.](#)

[Table 2.4 Diagnostic findings and problem list for Jasmine.](#)

[Table 2.5 Primary problems list for Jasmine \(\*apical base/skeletal discrepan...\*](#)

[Table 2.6 Diagnostic findings and problem list for Bella.](#)

[Table 2.7 Primary problems list for Bella \(\*apical base/skeletal discrepanci...\*\)](#)

[Table 2.8 Diagnostic findings and problem list for Amber.](#)

[Table 2.9 Primary problems list for Amber \(\*apical base/skeletal discrepancie...\*\)](#)

[Table 2.10 Diagnostic findings and problem list for Kate.](#)

[Table 2.11 Primary problems list for Kate.](#)

[Table 2.12 Diagnostic findings and problem list for Dillon.](#)

[Table 2.13 Timing of permanent tooth eruption.](#)

[Table 2.14 Primary problems list for Dillon.](#)

[Table 2.15 Diagnostic findings and problem list for Madison.](#)

[Table 2.16 Primary problems list for Madison \(\*apical base/skeletal discrepan...\*\)](#)

[Table 2.17 Diagnostic findings and problem list for Muriel.](#)

[Table 2.18 Primary problems list for Muriel \(\*apical base/skeletal discrepanc...\*\)](#)

[Table 2.19 Diagnostic findings and problem list for Mudathir.](#)

[Table 2.20 Primary problems list for Mudathir.](#)

[Table 2.21 Diagnostic findings and problem list for Lucas.](#)

[Table 2.22 Primary problems list for Lucas.](#)

[Table 2.23 Diagnostic findings and problem list for Jeff.](#)

[Table 2.24 Primary problems list for Jeff \(\*apical base/skeletal discrepanci...\*\)](#)

[Table 2.25 Diagnostic findings and problems list for Kasandra.](#)

[Table 2.26 Primary problems list for Kasandra.](#)

[Table 2.27 Diagnostic findings and problem list for Clair.](#)

[Table 2.28 Primary problems list for Clair.](#)

## Chapter 3

[Table 3.1 Diagnostic findings and problems list for Brody.](#)

[Table 3.2 Primary problems list for Brody.](#)

[Table 3.3 Diagnostic findings and problems list for Rebecca.](#)

[Table 3.4 Primary problems list for Rebecca.](#)

[Table 3.5 Diagnostic findings and problems list for Alicia.](#)

[Table 3.6 Primary problems list for Alicia.](#)

[Table 3.7 Diagnostic findings and problems list for Trista.](#)

[Table 3.8 Primary problems list for Trista.](#)

[Table 3.9 Primary problems list for Trista as she enters comprehensive treat...](#)

[Table 3.10 Diagnostic findings and problems list for Melissa.](#)

[Table 3.11 Primary problems list for Melissa.](#)

[Table 3.12 Primary problems list for Melissa.](#)

[Table 3.13 Diagnostic findings and problems list for Cara.](#)

[Table 3.14 Primary problems list for Cara.](#)

[Table 3.15 Diagnostic findings and problems list for Easton.](#)

[Table 3.16 Primary problems list for Easton.](#)

[Table 3.17 Diagnostic findings and problems list for Katie.](#)

[Table 3.18 Primary problems list for Katie.](#)

[Table 3.19 Diagnostic findings and problem list for Erin.](#)

[Table 3.20 Primary problems list for Erin.](#)

[Table 3.21 Diagnostic findings and problems list for Brian.](#)

[Table 3.22 Primary problems list for Brian.](#)

## Chapter 4

[Table 4.1 Primary problem list for Alana.](#)

[Table 4.2 Primary problems' list for Marc.](#)

[Table 4.3 Diagnostic findings and problem list for Jake.](#)

[Table 4.4 Primary problem list for Jake.](#)

[Table 4.5 Diagnostic findings and problem list for Alexandra.](#)

[Table 4.6 Primary problem list for Alexandra.](#)

[Table 4.7 Diagnostic findings and problem list for Mark.](#)

[Table 4.8 Primary problem list for Mark.](#)



[Table 4.9 Diagnostic findings and problem list for Cory.](#)

[Table 4.10 Primary problem list for Cory.](#)

[Table 4.11 Diagnostic findings and problem list for Mason.](#)

[Table 4.12 Primary problem list for Mason.](#)

[Table 4.13 Diagnostic findings and problem list for Edward.](#)

[Table 4.14 Primary problem list for Edward.](#)

[Table 4.15 Diagnostic findings and problem list for Cooper.](#)

[Table 4.16 Primary problem list for Cooper.](#)

[Table 4.17 Diagnostic findings and problem list for Allison.](#)

[Table 4.18 Primary problem list for Allison.](#)

[Table 4.19 Diagnostic findings and problem list for Nathan.](#)

[Table 4.20 Cephalometric diagnostic findings and problem list for Nathan.](#)

[Table 4.21 Primary problem list for Nathan.](#)

[Table 4.22 Diagnostic findings and problem list for Carlie.](#)

[Table 4.23 Primary problem list for Carlie.](#)

## Chapter 5

[Table 5.1 Primary problems list for Carson.](#)

[Table 5.2 Diagnostic findings and problem list for Adam.](#)

[Table 5.3 Primary problems list for Adam.](#)

[Table 5.4 Primary\\_problem list for Elijah.](#)

[Table 5.5 Diagnostic findings and problem list for Rachael.](#)

[Table 5.6 Primary\\_problems list for Rachael.](#)

[Table 5.7 Primary\\_problems list for Anisa.](#)

[Table 5.8 Diagnostic findings and problem list for Mark.](#)

[Table 5.9 Primary\\_problems list for Mark.](#)

[Table 5.10 Diagnostic findings and problem list for Lynnear.](#)

[Table 5.11 Primary\\_problem list for Lynnear.](#)

[Table 5.12 Diagnostic findings and problem list for Sydney.](#)

[Table 5.13 Primary\\_problem list for Sydney.](#)

[Table 5.14 Diagnostic findings and problem list for Ned.](#)

[Table 5.15 Primary\\_problems list for Ned.](#)

[Table 5.16 Diagnostic findings and problem list for Emily.](#)

[Table 5.17 Primary\\_problems list for Emily.](#)

[Table 5.18 Diagnostic findings and problem list for Gabby.](#)

[Table 5.19 Primary\\_problems list for Gabby.](#)

[Table 5.20 Diagnostic findings and problem list for Carter.](#)

[Table 5.21 Primary\\_problems list for Carter.](#)

[Table 5.22 Diagnostic findings and problem list for Tricia.](#)

[Table 5.23 Primary\\_problems list for Tricia.](#)

[Table 5.24 Diagnostic findings and problem list for Nora.](#)

[Table 5.25 Primary\\_problems list for Nora.](#)

[Table 5.26 Diagnostic findings and problem list for Mara.](#)

[Table 5.27 Primary\\_problems list for Mara.](#)

[Table 5.28 Cephalometric findings for Mara.](#)

## Chapter 6

[Table 6.1 Primary\\_problems list for Anneke.](#)

[Table 6.2 Primary\\_problems list for Anneke at age twelve years.](#)

[Table 6.3 Diagnostic findings and problem list for Jasmin.](#)

[Table 6.4 Primary\\_problem list for Jasmin.](#)

[Table 6.5 Primary\\_problem list for Jasmin.](#)

[Table 6.6 Diagnostic findings and problem list for Jenna.](#)

[Table 6.7 Primary\\_problems list for Jenna.](#)

[Table 6.8 Diagnostic findings and problem list for Jonathan.](#)

[Table 6.9 Primary\\_problems list for Jonathan.](#)

[Table 6.10 Diagnostic findings and problem list for Alaina.](#)

[Table 6.11 Primary\\_problems list for Alaina.](#)

[Table 6.12 Diagnostic findings and problem list for Halee.](#)

[Table 6.13 Primary\\_problems list for Halee.](#)

## Appendix

[Table A.1 Template: diagnostic findings and problems list.](#)

[Table A.2 Template: primary problem list.](#)

# List of Illustrations

## Chapter 1

[Figure 1.1 Initial records of Theo: \(a-c\) facial photographs, \(d-e\) lateral ...](#)

[Figure 1.2 Enlargement of a portion of Theo's lateral cephalometric radiogra...](#)

[Figure 1.3 Measurement of the angle formed between the Nasion-perpendicular ...](#)

[Figure 1.4 Maxillary fixed appliances were placed to advance Theo's maxillar...](#)

[Figure 1.5 \(a-h\) Early treatment deband photographs of Theo. Previous incisa...](#)

[Figure 1.6 Records of Theo when he returned to our clinic at age fifteen yea...](#)

[Figure 1.7 \(a-u\) Progress records of Theo. The panoramic radiograph in J was...](#)

[Figure 1.8 Initial records of Jack: \(a-c\) facial photographs, \(d-e\) lateral ...](#)

[Figure 1.9 \(a-e\) Progress records of Jack illustrating RME to correct his ma...](#)

[Figure 1.10 Initial records of Caden: \(a-c\) facial photographs, \(d-e\) latera...](#)

[Figure 1.11 Initial records of Dylan: \(a-c\) facial photographs, \(d\) pantomog...](#)

[Figure 1.12 \(a-d\) Progress records of Dylan, \(e\) circumferential supracresta...](#)

[Figure 1.13 \(a-h\) Deband photos of Dylan.](#)

[Figure 1.14 \(a\) Changes in size, shape, and position of the major skeletal c...](#)

[Figure 1.15 Axial view of the endocranial surfaces of the cranial base. Shad...](#)

[Figure 1.16 Changes in size, shape, and position of the cranial base during ...](#)

[Figure 1.17 \(a-c\) Nasomaxillary complex displaying sutures in common with ad...](#)

[Figure 1.18 Changes in size, shape, and position of the maxilla and maxillar...](#)

[Figure 1.19 The mandible consists of five regions: \(1\) condyle, \(2\) coronoid...](#)

[Figure 1.20 The development of the pharynx from childhood to adolescence.](#)

[Figure 1.21 The anatomical divisions of the mature pharynx.](#)

[Figure 1.22 \(a, b\) Patient exhibiting a normal maxilla and hypoplastic/defic...](#)

[Figure 1.23 Mean transverse basilar, cross arch alveolar, and inter molar ch...](#)

[Figure 1.24 Average transverse molar movements from ages seven to twenty six...](#)

[Figure 1.25 \(a-b\) Transverse posterior dental compensations.](#)

[Figure 1.26 Variation in transverse skeletal widths in the absence of crossb...](#)

[Figure 1.27 Effect of differential anteroposterior jaw growth on the transve...](#)

[Figure 1.28 Diagram of the pathophysiology of pediatric obstructive sleep ap...](#)

[Figure 1.29 Overall superimposition of cephalometric tracings depicting two ...](#)

[Figure 1.30 \(a\) Plot of change in stature with age. \(b\) Plot of change in gr...](#)

[Figure 1.31 A growth chart recording statural height measurements of a girl ...](#)

[Figure 1.32 Description of root development stages: one-half root formation ...](#)

[Figure 1.33 Longitudinal complete mouth series radiographs for subject F8 fr...](#)

[Figure 1.34 Longitudinal complete mouth series radiographs for a subject F8 ...](#)

[Figure 1.35 Longitudinal complete mouth series radiographs for subject F8 fr...](#)

[Figure 1.36 Longitudinal complete mouth series radiographs for subject F8 fr...](#)

[Figure 1.37 Density curves displaying the variation in age of emergence of p...](#)

[Figure 1.38 Diagrammatic illustration of \(a\) straight terminal plane, \(b\) di...](#)

[Figure 1.39 \(a\) A straight terminal plane in the mixed dentition can transit...](#)

[Figure 1.40 Inter canine width increase during permanent lateral incisor erup...](#)

[Figure 1.41 Mesial drift of permanent posterior teeth \(red solid arrows\) dur...](#)

[Figure 1.42 Loss of mandibular right primary first molar.](#)

[Figure 1.43 Premature loss of maxillary left primary second molar and subseq...](#)

[Figure 1.44 \(a\) Significant drift/space closure following loss of primary ma...](#)

[Figure 1.45 Perimeter measurement of the dental arch in four segments. \(a\) M...](#)

## Chapter 2

[Figure 2.1 \(a-q\) Estimating anterior crowding.](#)

[Figure 2.2 Mandibular anterior crowding in a mixed dentition patient.](#)

[Figure 2.3 Effect of mandibular space maintenance using LLHAs \(lower lingual...](#)

[Figure 2.4 Transition between mixed and permanent dentitions. \(a\) Crowded ma...](#)

[Figure 2.5 Mandibular arch model.](#)

[Figure 2.6 The same mandibular arch of Figure 2.5 after placement of an LLHA...](#)

[Figure 2.7 Leave the LLHA cemented in the patient until \*after\* braces are pla...](#)

[Figure 2.8 Mandibular left primary second molar recently exfoliated. We are ...](#)

[Figure 2.9 Recent loss of a mandibular left primary second molar. \(a\) To pre...](#)

[Figure 2.10 LLHA uses: \(a\) first molar \*bilateral\* expansion or constriction, ...](#)

[Figure 2.11 Mandibular right permanent second molar impaction under an LLHA ...](#)

[Figure 2.12 LLHA with spurs to prevent distal incisor drift.](#)

[Figure 2.13 Extraction of mandibular primary canines results in spontaneous ...](#)

[Figure 2.14 Space maintainers we do \*not\* recommend include \(a, b\) LLHAs cemen...](#)

[Figure 2.15 Maxillary space maintainers: \(a\) Nance holding arch appliance, \(...](#)

[Figure 2.16 Panoramic image of an eight-year-old boy.](#)

[Figure 2.17 \*Space regaining appliances: \(a, b\) fixed orthodontic appliances ...\*](#)

[Figure 2.18 Same patient as in Figure 2.16 after ectopically erupted maxilla...](#)

[Figure 2.19 Mandibular space regaining following premature loss of the mandi...](#)

[Figure 2.20 \(a, b\) Split plate space-regaining appliance.](#)

[Figure 2.21 \(a-d\). Estimating space needed to retract/upright proclined mand...](#)

[Figure 2.22 \(a-f\) A common serial extraction sequence used to treat an other...](#)

[Figure 2.23 Serial extraction in a Class I patient who initially presents wi...](#)

[Figure 2.24 Initial records of Emma \(a-c\) facial photographs, \(d\) lateral ce...](#)

[Figure 2.25 \(a-k\) Emma's deband records.](#)

[Figure 2.26 Initial records of Amelia \(a-c\) facial photographs, \(d, e\), ceph...](#)



[Figure 2.27 Progress records of Amelia \(a\) de-impacting her maxillary left p...](#)

[Figure 2.28 \(a-k\) Progress records of Amelia at 12 years of age.](#)

[Figure 2.29 \(a-e\) Progress records of Amelia.](#)

[Figure 2.30 \(a-i\) Deband records of Amelia.](#)

[Figure 2.31 Initial records of Jasmine: \(a-c\) facial photographs, \(d\) pantom...](#)

[Figure 2.32 \(a, b\) A different patient with a clinical situation similar to ...](#)

[Figure 2.33 Initial records of Bella \(a-c\) facial photographs, \(d\) pantomogr...](#)

[Figure 2.34 Panoramic image of Bella one year later.](#)

[Figure 2.35 Initial records of Evan: \(a-c\) facial photographs, \(d, e\) latera...](#)

[Figure 2.36 \(a\) Cementation of a Nance holding arch and \(b\) an LLHA in Evan....](#)

[Figure 2.37 \(a-e\) Progress photographs of Evan following eruption of all per...](#)

[Figure 2.38 Initial records of Amber: \(a-c\) facial photographs, \(d, e\) later...](#)

[Figure 2.39 \(a-i\) Progress records of Amber at age 12. \(She had failed to re...](#)

[Figure 2.40 \(a-h\) Progress records made after Amber's arches were leveled an...](#)

[Figure 2.41 \(a-l\) Deband records of Amber.](#)

[Figure 2.42 Mandibular fixed retainer in Amber.](#)

[Figure 2.43 Initial records of Kate: \(a-c\) facial photographs, \(d, e\) latera...](#)

[Figure 2.44 Periapical radiograph of Kate's erupting mandibular left permane...](#)

[Figure 2.45 \(a, b\) Progress panoramic radiographs of Kate.](#)

[Figure 2.46 Deband records of Kate: \(a-c\) facial photographs, \(d, e\) lateral...](#)

[Figure 2.47 Initial records of Dillon: \(a-c\) facial photographs, \(d\) pantomo...](#)

[Figure 2.48 Additional records of Dillon. Lateral cephalometric radiograph \(...\)](#)

[Figure 2.49 \(a-e\) Progress records of Dillon showing space regaining for the...](#)

[Figure 2.50 \(a, b\) Progress records of Dillon following space regaining.](#)

[Figure 2.51 \(a-h\) Final records of Dillon after all permanent teeth erupted ...](#)

[Figure 2.52 Initial records of Madison: \(a-c\) facial photographs, \(d, e\) lat...](#)

[Figure 2.53 \(a-k\) Progress records of Madison one year later at nine years a...](#)

[Figure 2.54 \(a-k\) Progress records of Madison at 11 years and 1 month of age...](#)

[Figure 2.55 Progress panoramic image of Madison at 12 years and 3 months of ...](#)

[Figure 2.56 \(a, b\) To prevent lateral incisor root resorption following cani...](#)

[Figure 2.57 \(a, b\) Progress maxillary occlusal photographs illustrating forc...](#)

[Figure 2.58 \(a-l\) Deband records of Madison, \(f\) Lateral cephalometric radio...](#)

[Figure 2.59 Initial records of Muriel: \(a-c\) facial photographs, \(d\) pantomo...](#)

[Figure 2.60 Initial records of Mudathir: \(a-c\) facial photographs, \(d\) panto...](#)

[Figure 2.61 Initial records of Lucas: \(a-c\) facial photographs, \(d\) pantomog...](#)

[Figure 2.62 Modified RMEs to gain additional anchorage: \(a\) arms extending m...](#)

[Figure 2.63 Initial records of Jeff: \(a-c\) facial photographs, \(d, e\) latera...](#)

[Figure 2.64 Deband records of Jeff: \(a-c\) facial photographs, \(d, e\) lateral...](#)

[Figure 2.65 Initial records of Kasandra: \(a-c\) facial photographs, \(d, e\) la...](#)

[Figure 2.66 Progress records of Kasandra \(a-e\). Fixed orthodontic appliances...](#)

[Figure 2.67 LLHA with spurs soldered to prevent distal incisor drift.](#)

[Figure 2.68 Initial records of Clair: \(a-c\) facial photographs, \(d, e\) later...](#)

[Figure 2.69 Additional radiographs of Clair: \(a\) mandibular occlusal radiogr...](#)

[Figure 2.70 Progress radiograph of Clair one year later.](#)

[Figure 2.71 Progress records of Clair at 11 years and 9 months of age: \(a-c\)...](#)

[Figure 2.72 Deband records of Clair: \(a-c\) facial photographs, \(d, e\) latera...](#)

## Chapter 3

[Figure 3.1 Examples of ectopic tooth eruption and associated adverse sequela...](#)

[Figure 3.2 Erupting maxillary permanent canines: \(a\) normal eruption with th...](#)

[Figure 3.3 Panoramic image of a patient in the late mixed dentition who pres...](#)

[Figure 3.4 Early treatments to increase the likelihood that ectopically erup...](#)

[Figure 3.5 Position factors affecting spontaneous eruption of ectopic maxill...](#)

[Figure 3.6 Initial panoramic image of a nine-year-old.](#)

[Figure 3.7 Progress panoramic image of the patient shown in Figure 3.6, six ...](#)

[Figure 3.8 Radiograph illustrating ectopically erupting mandibular canines...](#)

[Figure 3.9 Progress records of the patient shown in Figure 3.8 following ext...](#)

[Figure 3.10 Surgical exposure of an ectopically erupting maxillary left perm...](#)

[Figure 3.11 Using an elevator to check mobility of the impacted maxillary ca...](#)

[Figure 3.12 Orthodontic movement of surgically exposed canines: \(a\) \*do not\* d...](#)

[Figure 3.13 Orthodontic movement of surgically exposed, labially impacted, m...](#)

[Figure 3.14 Orthodontic movement of surgically exposed, labially impacted, m...](#)

[Figure 3.15 \(a and b\) Intraoral photos of a patient presenting with ectopic ...](#)

[Figure 3.16 Treatment of the patient shown in Figure 3.15: \(a\) following ext...](#)

[Figure 3.17 If the maxillary right primary second molar had been nonmobile, ...](#)

[Figure 3.18 Treatment of ectopically erupting mandibular permanent first mol...](#)

[Figure 3.19 Halterman appliances used to \(a\) free ectopically erupting mandi...](#)

[Figure 3.20 Surgical luxation and elevation of ectopically erupting mandibul...](#)

[Figure 3.21 Panoramic images of two mixed dentition patients. Take note of t...](#)

[Figure 3.22 \(a\) Alveolar bone crest levels \(red lines\) in normally erupting ...](#)

[Figure 3.23 Progress panoramic images of the patient shown in Figure 3.21b. ...](#)

[Figure 3.24 Initial panoramic image of a seven-year-old girl.](#)

[Figure 3.25 Progress panoramic radiograph of the patient in Figure 3.24.](#)

[Figure 3.26 Progress radiograph of the patient in Figure 3.24 \(a\) 1 year lat...](#)

[Figure 3.27 Initial panoramic image of an early mixed dentition patient.](#)

[Figure 3.28 Progress record of the patient in Figure 3.27 three years later....](#)

[Figure 3.29 Two possible reasons for a delayed eruption of a permanent secon...](#)

[Figure 3.30 \(a and b\) Initial radiographs of a 15-year-old girl.](#)

[Figure 3.31 Progress image of the patient shown in Figure 3.30.](#)

[Figure 3.32 Radiograph of the same patient in Figure 3.30 following completi...](#)

[Figure 3.33 Retention radiograph of the patient in Figure 3.30 10 years late...](#)

[Figure 3.34 Examples where the retained primary second molar \(lacking a succ...](#)

[Figure 3.35 \(a-c\) For extraction cases, one option is to extract the retaine...](#)

[Figure 3.36 Following extraction of a retained primary second molar lacking ...](#)

[Figure 3.37 \(a\) Following extraction of a hopeless mandibular primary second...](#)

[Figure 3.38 Initial panoramic image of a 12-year-old girl.](#)

[Figure 3.39 Progress radiograph of the same patient in Figure 3.38 at age 13...](#)

[Figure 3.40 Panoramic image of the patient in Figure 3.38 at age 16 years.](#)

[Figure 3.41 Magnified images of the mandibular left primary second molar reg...](#)

[Figure 3.42 \(a-e\) Ankylosed mandibular primary second molars without success...](#)

[Figure 3.43 Late premolar crown development. \(a\) When comparing development ...](#)

[Figure 3.44 \(a-d\) Controlled slicing is a technique to achieve bodily first ...](#)

[Figure 3.45 \(a-c\) Reducing the mesiodistal width of a primary second molar t...](#)

[Figure 3.46 \(a\) If you keep a retained mandibular primary second molar lacki...](#)

[Figure 3.47 Maintaining an \*ankylosed\* mandibular primary second molar lacking...](#)

[Figure 3.48 \(a\) If you wish to maintain a primary tooth, avoid bonding it, b...](#)

[Figure 3.49 \(a and b\) Child in the late mixed dentition with a retained mand...](#)

[Figure 3.50 Radiographs of a patient with six retained primary teeth lacking...](#)

[Figure 3.51 Examples of retained primary second molars lacking permanent suc...](#)

[Figure 3.52 Panoramic image of a 10-year-old girl having severe decay/severe...](#)

[Figure 3.53 Panoramic image of a 10-year-old boy with hopelessly decayed per...](#)

[Figure 3.54 Patient shown in Figure 3.53 six months later following extracti...](#)

[Figure 3.55 Patient shown in Figure 3.53 three years later following extract...](#)

[Figure 3.56 Initial records of Brody: \(a-c\) facial photographs, \(d and e\) la...](#)

[Figure 3.57 Judging mandibular skeletal position when the maxillary anteropo...](#)

[Figure 3.58 \(a-e\) Progress photos of Brody.](#)

[Figure 3.59 Initial records of Rebecca: \(a-c\) facial photographs, \(d and e\) ...](#)

[Figure 3.60 Panoramic image of Rebecca made at age eight.](#)

[Figure 3.61 \(a-e\) Progress records of Rebecca.](#)

[Figure 3.62 \(a-f\) Progress records of Rebecca.](#)

[Figure 3.63 \(a-i\) Deband records of Rebecca.](#)

[Figure 3.64 Initial records of Alicia: \(a-c\) facial photographs, \(d and e\) l...](#)

[Figure 3.65 \(a-e\) Progress records of Alicia.](#)

[Figure 3.66 \(a-c\) Progress records of Alicia.](#)

[Figure 3.67 \(a-c\) Progress records of Alicia during comprehensive treatment....](#)

[Figure 3.68 \(a-q\) Deband records of Alicia.](#)

[Figure 3.69 Initial records of Trista: \(a-c\) facial photographs, \(d and e\) l...](#)

[Figure 3.70 \(a-e\) Progress records of Trista at 10 years and 3 months of age...](#)

[Figure 3.71 \(a-q\) Progress records of Trista at thirteen years and seven mon...](#)

[Figure 3.72 Initial records of Melissa: \(a-c\) facial photographs, \(d\) pantom...](#)

[Figure 3.73 Panoramic image of Melissa made at age 6 years and 10 months.](#)

[Figure 3.74 Progress panoramic image of Melissa at age nine years and eight ...](#)

[Figure 3.75 \(a-p\) Progress records of Melissa at ten years and ten months of...](#)

[Figure 3.76 Initial records of Cara: \(a-c\) facial photographs, \(d\) pantomogr...](#)



[Figure 3.77 Progress panoramic image of Cara at eleven years of age.](#)

[Figure 3.78 Magnified panoramic images of Cara's mandibular right primary se...](#)

[Figure 3.79 An erupting mandibular permanent first molar tipping to the mesi...](#)

[Figure 3.80 Progress panoramic image of Cara made sometime after extraction ...](#)

[Figure 3.81 Deband panoramic image of Cara.](#)

[Figure 3.82 Initial records of Easton: \(a-c\) facial photographs, \(d and e\) c...](#)

[Figure 3.83 Panoramic image of Easton made at six years of age.](#)

[Figure 3.84 Maxillary left space regaining using a removable screw distalize...](#)

[Figure 3.85 \(a-f\) Progress records of Easton at nine years of age. \(g\) Progr...](#)

[Figure 3.86 Initial records of Katie: \(a-c\) facial photographs, \(d and e\) la...](#)

[Figure 3.87 An elastomeric separator \(or twisted brass wire\) can be inserted...](#)

[Figure 3.88 \(a-e\) Early treatment progress images of Katie.](#)

[Figure 3.89 Records of Katie following maxillary permanent lateral incisor e...](#)

[Figure 3.90 Initial records of Erin: \(a-c\) facial photographs, \(d and e\) lat...](#)

[Figure 3.91 Erin's permanent molar relationships as seen from the lingual. \(...\)](#)

[Figure 3.92 Final records of Erin at age fourteen years.](#)

[Figure 3.93 Erin's retained mandibular right primary second molar \(a\) before...](#)

[Figure 3.94 Initial records of Brian: \(a-c\) facial photographs, \(d and e\) la...](#)

[Figure 3.95 Frontal photograph of Brian \(a\) in CR and \(b\) shifting forward b...](#)

[Figure 3.96 Progress panoramic image of Brian following alignment of his max...](#)

[Figure 3.97 Progress periapical radiograph of Brian's mandibular left primar...](#)

[Figure 3.98 \(a-i\) Deband records of Brian.](#)

[Figure 3.99 Brian's mandibular left primary second molar was extracted, and ...](#)

## Chapter 4

[Figure 4.1 \(a, left\) Measure of overjet and \(a, right\) ideal OJ. \(b-d\) Examp...](#)

[Figure 4.2 Excessive OJ can result from: \(a\) a skeletal discrepancy between ...](#)

[Figure 4.3 \(a-c\) A 7-year-old girl with excessive OJ.](#)

[Figure 4.4 \(a-d\) Diagram illustrating the fact that closing maxillary anteri...](#)

[Figure 4.5 Initial records of Alana. \(a-c\) facial photographs, \(d-e\) lateral...](#)

[Figure 4.6 Options for correcting Class II skeletal relationships may includ...](#)

[Figure 4.7 \(a\) High-pull headgear; \(b\) cervical-pull headgear; \(c-d\) full co...](#)

[Figure 4.8 Class II functional appliances. \(a-b\) Herbst appliance; \(c\) biona...](#)

[Figure 4.9 \(a-l\) Deband photographs and post-treatment cephalometric analysi...](#)

[Figure 4.10 \(a\) Inadeqate OJ/anterior crossbite usually results: \*skeletally\*,...](#)

[Figure 4.11 Pseudo Class III malocclusion \(a\) with anterior crossbite in CO ...](#)

[Figure 4.12 Malocclusion due to a 1 mm CR-CO shift in the primary dentition:...](#)

[Figure 4.13 Examples of decisions to either correct anterior crossbites or n...](#)

[Figure 4.14 \(a-i\) Initial records of Tomas, a seven-year-old boy with anteri...](#)

[Figure 4.15 \(a-i\) Initial records of Ramus, a seven-year-old boy with an ant...](#)

[Figure 4.16 \(a-f\) Progress records of Ramus.](#)

[Figure 4.17 Ramus biting on a tongue blade.](#)

[Figure 4.18 \(a-c\) Progress records of Ramus.](#)

[Figure 4.19 \(a\) Correcting an anterior crossbite \(b\) requires opening the OB...](#)

[Figure 4.20 \(a\) Class I child with anterior crossbite. \(b-c\) Orthodontic cem...](#)

[Figure 4.21 Removable maxillary appliances incorporate an acrylic posterior ...](#)

[Figure 4.22 Initial records of Marc. \(a-c\) facial photographs, \(d-e\) lateral...](#)

[Figure 4.23 The maxillary lateral incisor bracket can be tipped \(left\) so th...](#)

[Figure 4.24 Marc's Class III relationship could be corrected with orthopedic...](#)

[Figure 4.25 \(a-b\) Reverse-pull facemask or headgear.](#)

[Figure 4.26 \(a-e\) Intentionally ankylosing maxillary primary canines for use...](#)

[Figure 4.27 \(a-b\) High-pull chin cup.](#)

[Figure 4.28 \(a-k\) Initial records of Alex and \(l\) correction of his anterior...](#)

[Figure 4.29 \(a-f\) Progress records of Alex one year after his anterior cross...](#)

[Figure 4.30 \(a-i\) Final records of Alex after growth was complete. Alex and ...](#)

[Figure 4.31 Orthopedic treatment using Class III elastics supported by TAD \(...\)](#)

[Figure 4.32 \(a-c\). Marc was treated with a TAD \(miniplate\)-supported RPHG.](#)

[Figure 4.33 \(a-h\) Progress records of Marc. His anterior crossbite and Class...](#)

[Figure 4.34 Progress panoramic image of Marc showing significant root resorp...](#)

[Figure 4.35 \(a-i\). Final records of Marc.](#)

[Figure 4.36 Initial records of Jake. \(a-c\) facial photographs, \(d\) pantomogr...](#)

[Figure 4.37 Evaluating Jake's chin projection. \(a\) profile, \(b\) ideally, the...](#)

[Figure 4.38 Initial consultation records of Alexandra. \(a-c\) facial photogra...](#)

Figure 4.39 Initial records of Mark: (a-c) facial photographs, (d-e) lateral...

Figure 4.40 (a-b) Mark's models viewed from the front.

Figure 4.41 Effects of opening a deep overbite (OB) with fixed orthodontic a...

Figure 4.42 (a-b) Evaluation of Mark's maxillary and mandibular crown torque...

Figure 4.43 Mark's early mandibular arch treatment. (a and b) A 2x4 fixed ap...

Figure 4.44 (a-r) Mark's comprehensive deband records.

Figure 4.45 (a-h) 10-year recall records of Mark.

Figure 4.46 Initial records of Cory: (a-c) facial photographs, (d-e) lateral...

Figure 4.47 (a) Pendulum appliance supported with palatal TAD (green) in the...

Figure 4.48 In a Class II patient with severe mandibular skeletal deficiency...

Figure 4.49 Schwarz appliance. As the midline screw is opened, posterior tee...

Figure 4.50 If an LLHA or Schwarz appliance is used to expand Cory's mandibu...

Figure 4.51 During early treatment, Cory wore a high-pull headgear for Class...

Figure 4.52 (a-r) Deband records for Cory.

Figure 4.53 Initial records of Mason: (a-c) facial photographs, (d) pantomog...

[Figure 4.54 \(a-c\) Intraoral photographs of Mason in CR.](#)

[Figure 4.55 \(a-b\) Lateral cephalometric radiograph and tracing made in CR. N...](#)

[Figure 4.56 \(a-c\) Progress records of Mason. Fixed orthodontic appliances we...](#)

[Figure 4.57 \(a-e\) Progress records after crossbite correction \(orthodontic c...](#)

[Figure 4.58 \(a-e\) Deband intraoral photos of Mason.](#)

[Figure 4.59 \(a-i\) Recall records of Mason after all permanent teeth \(except ...](#)

[Figure 4.60 Initial records of Edward: \(a-c\) facial photographs in CO, \(d\) p...](#)

[Figure 4.61 Progress records of Edward. \(a-c\) in CR occluding on posterior c...](#)

[Figure 4.62 Progress records of Edward. \(a\) fixed appliances advanced the ma...](#)

[Figure 4.63 \(a-k\) Records of Edward made seven years after completion of ear...](#)

[Figure 4.64 Initial records of Cooper: \(a-c\) facial photographs, \(d\) pantomo...](#)

[Figure 4.65 Evaluating chin position. \(a\) profile view, \(b\) zero meridian-li...](#)

[Figure 4.66 Left-side asymmetric excessive mandibular condylar growth. Note ...](#)

[Figure 4.67 Initial records of Allison: \(a-c\) facial photographs, \(d-e\) late...](#)

[Figure 4.68 Determining whether a posterior crossbite is skeletal or dental....](#)