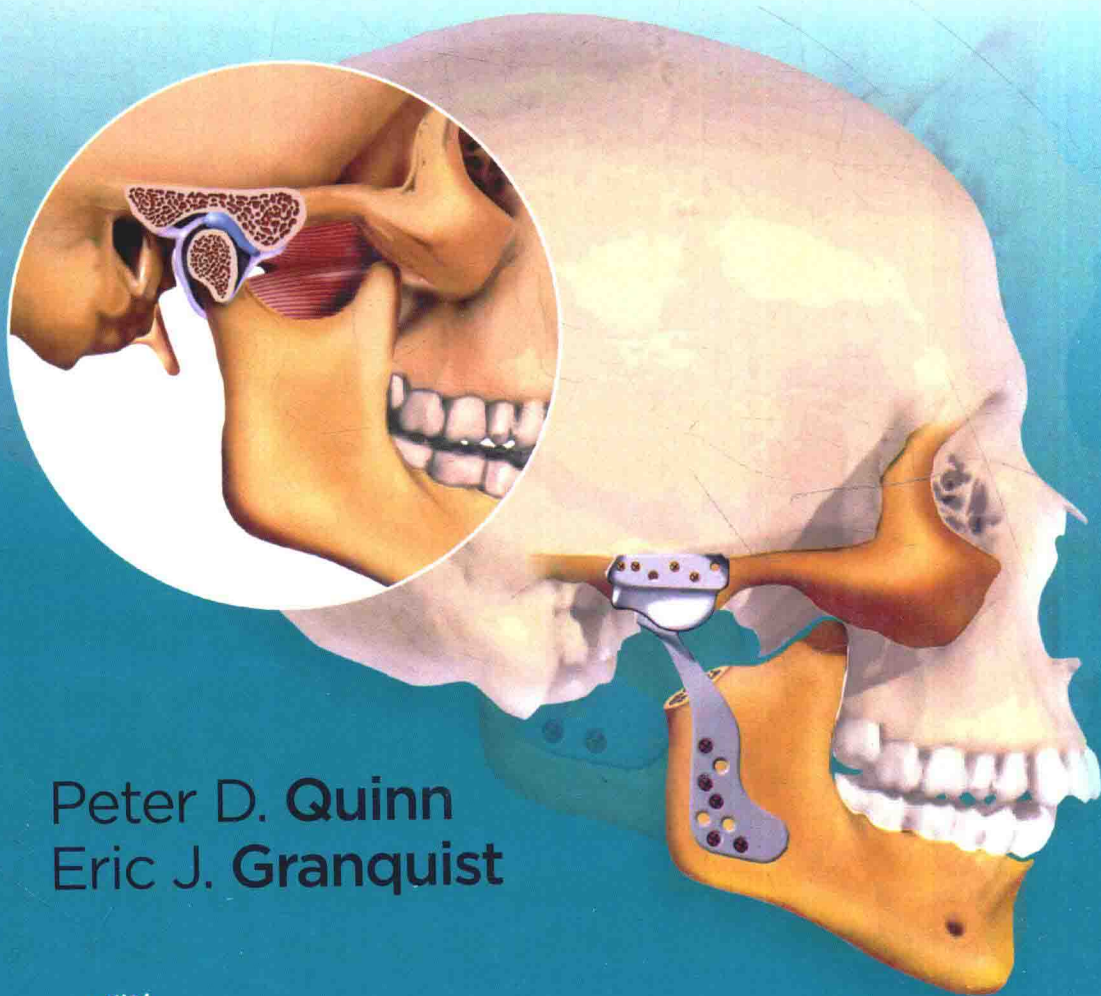


# ATLAS OF **TEMPOROMANDIBULAR JOINT SURGERY**

SECOND EDITION



Peter D. Quinn  
Eric J. Granquist



**WILEY** Blackwell

# Atlas of Temporomandibular Joint Surgery

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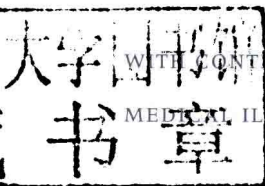
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WITH CONTRIBUTION FROM

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**WILEY** Blackwell

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# Preface

*Surgical knowledge depends on long practice,  
not from speculation.*

Marcello Malpighi, 1689

Surgical management of the temporomandibular joint has been one of the most vexing and controversial disciplines within oral and maxillofacial surgery. In 1999, we felt that there had been substantial evidence-based initiatives in therapeutic surgical interventions for advanced temporomandibular joint disorders sufficient enough to warrant a surgical atlas. We believe that the incredible advances over the last 15 years in surgical management, and decision-making, clearly justify an updated edition of this atlas. Both editions presume that a comprehensive,

nonsurgical intervention has been explored prior to consideration of any open surgical approach. We wanted to produce a concise “how-to” surgical guide for both the novice and experienced surgeon. Intra-articular and extra-articular open procedures, for the correction of diseases involving the temporomandibular joint, which have been shown to be safe and efficacious are reviewed in detail. We believe that only through clinical trials, and well-designed translational research, will we continue to further our understanding of the complexities of this unique articulation. It is our sincere hope that the second edition of this surgical atlas will contribute to this most important scientific endeavor.

# Acknowledgments

To Dr. Louis Schoenleber for his wisdom, mentorship, and generosity.

To our colleagues in the American Society of Temporomandibular Surgeons for their support and guidance.

To the Center for Human Appearance at the University of Pennsylvania for their commitment to scholarly activity.

To our Wives, Eileen Quinn and Sarah Granquist, for their tolerance and unwavering encouragement.

# About the companion website

*Atlas of Temporomandibular Joint Surgery* is accompanied by a companion website:

**[www.wiley.com/go/quinn/atlasTMJsurgery](http://www.wiley.com/go/quinn/atlasTMJsurgery)**

The website includes:

- Videos showing procedures described in the book
  - Incision design and placement for approaches to the TMJ
  - Stock alloplastic fossa placement
  - Eminoplasty
  - Condylectomy
  - Alloplastic total joint replacement
- Powerpoints of all figures from the book for downloading



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## CHAPTER 1

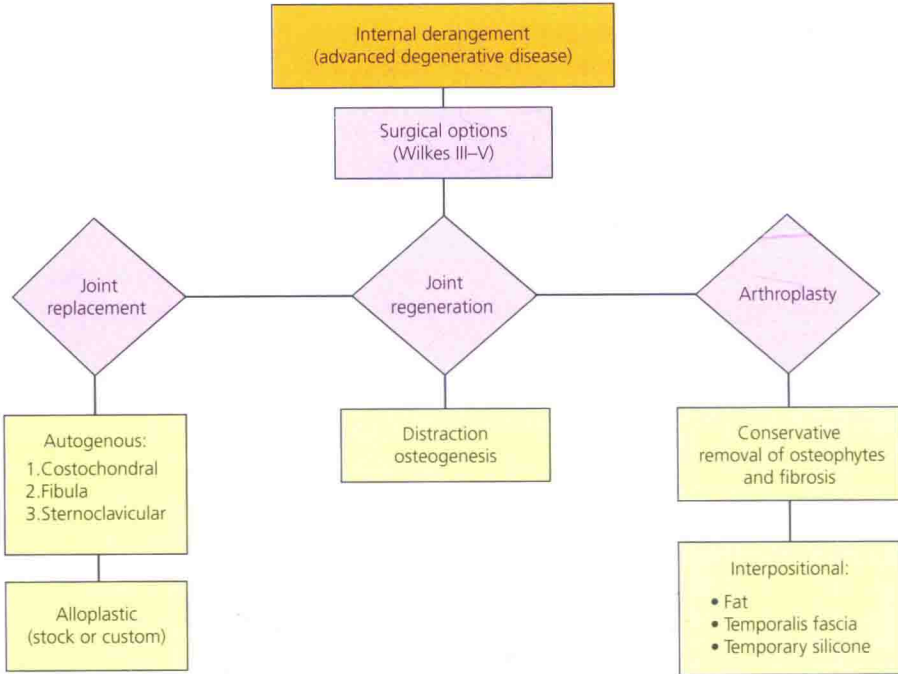
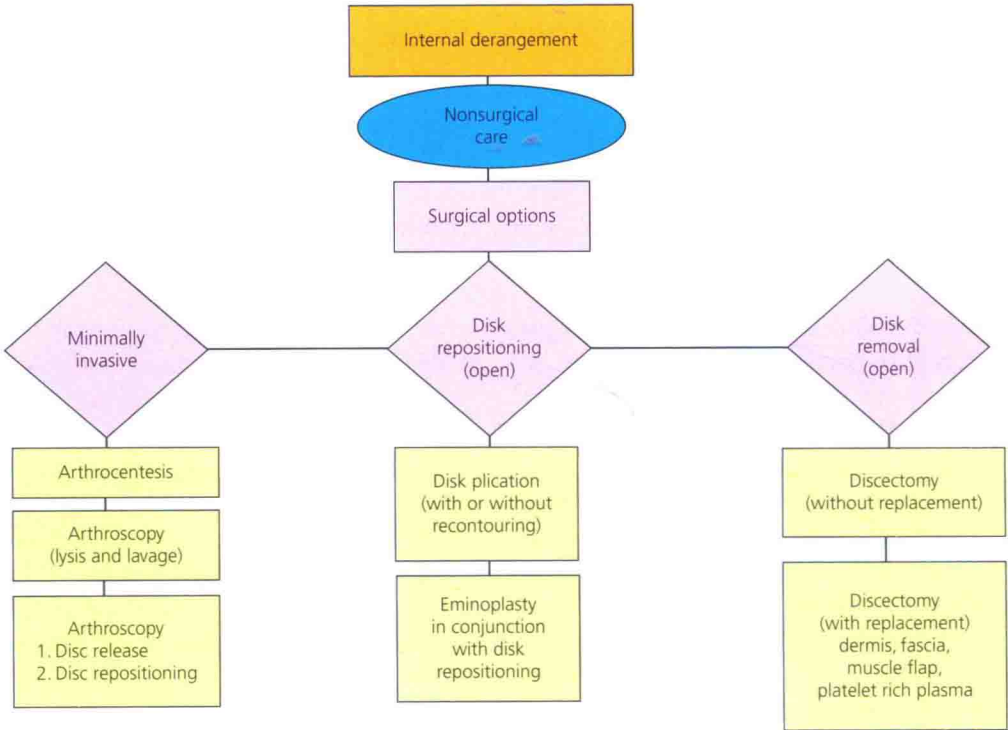
# Surgical decision making for temporomandibular joint surgery

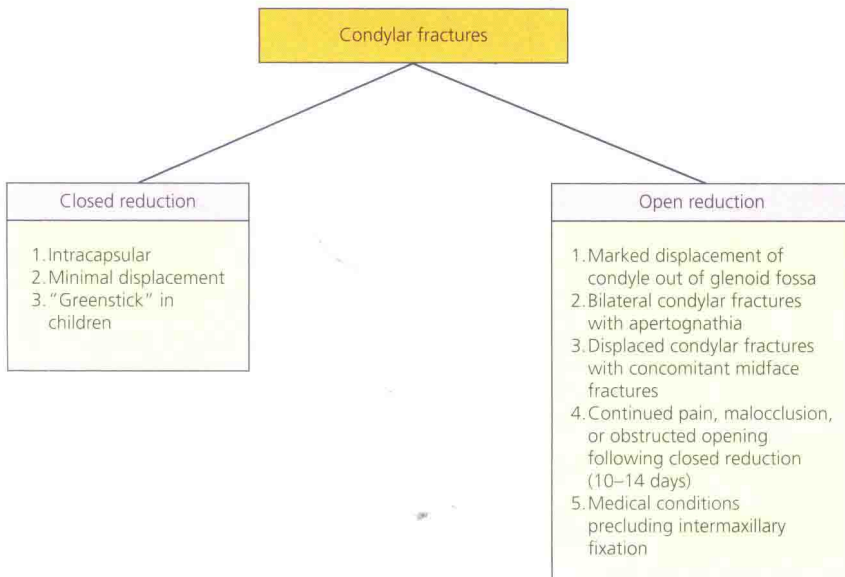
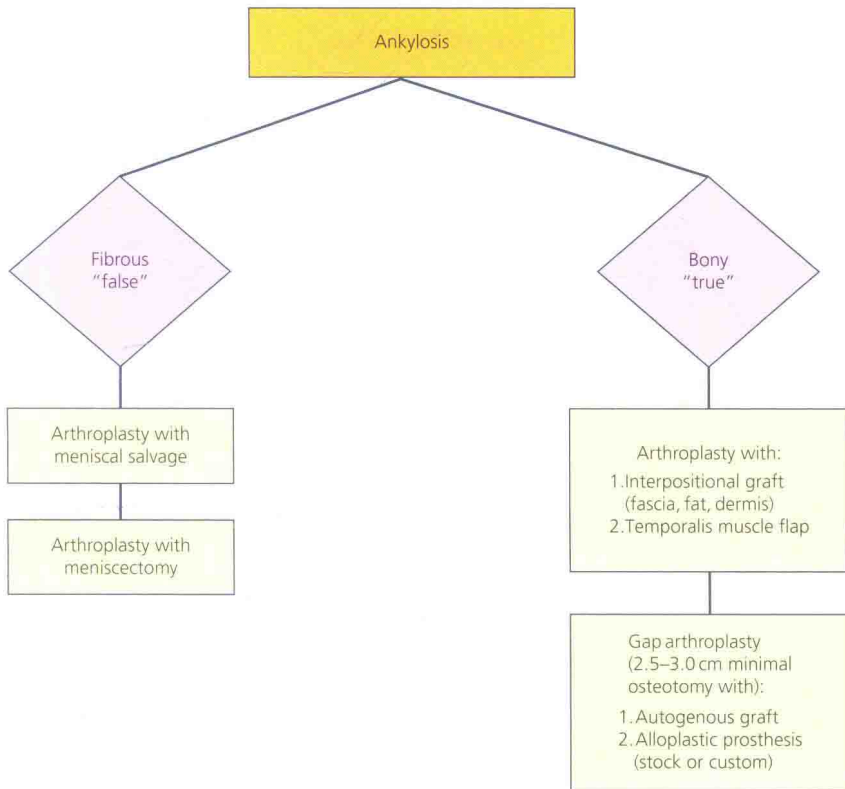
Correct diagnosis and surgical planning is the key to successful surgical outcomes. Many controversies exist in the management, indications for surgery, and the correct surgical procedure in temporomandibular joint disease. As a number of interventions and management schemes are currently accepted in the literature, these controversies only serve to complicate decision making in temporomandibular joint surgery for internal derangement, trauma, and management of benign and malignant disorders. Several excellent comprehensive textbooks on temporomandibular joint disorders explore the basis for these controversies and provide a historical and scientific overview of this problematic area of maxillofacial surgery.

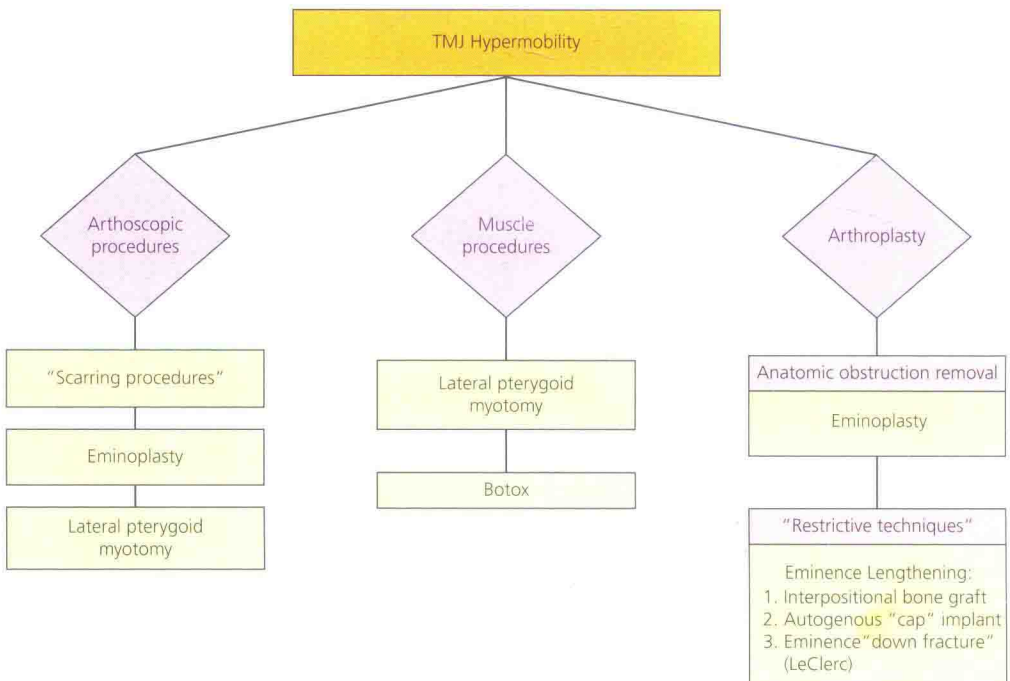
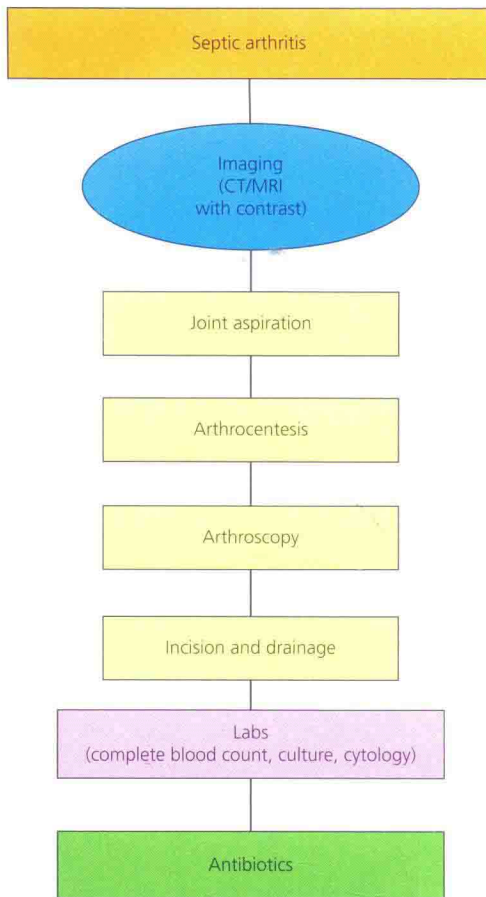
The intent of this text is simply to illustrate the technical aspects of the various surgical procedures on the temporomandibular joint. No attempt was made to champion a single approach to temporomandibular joint surgery. Ultimately, only well-designed clinical studies can prove, or disprove, the safety and efficacy of the individual procedures. It is our hope that scientific evidence will one day provide the *sine qua non* that will dictate the proper role

for all the potential surgical modalities, including arthroscopy, meniscal repair, and the use of both autogenous and alloplastic materials in joint reconstruction, and eventually, the use of tissue engineering in the management of temporomandibular joint reconstruction. Although serious mistakes have been made in the management of the temporomandibular joint, surgeons cannot allow the failures of the past to obscure the needs of the future.

This text is based on the assumption that primarily extra-articular conditions are most amenable to nonsurgical care. Patients with true internal derangements may benefit from nonsurgical care, and all these modalities should be exhausted before proceeding with any surgical option. The following algorithms are useful as guidelines but must always be modified according to the needs of the individual patient. These algorithms list only current acceptable surgical techniques for various conditions and make no attempt to advocate one surgical procedure over another one. Because several excellent comprehensive texts dealing with arthroscopic techniques are available, this book deals only with open-joint surgical procedures.







## CHAPTER 2

# Diagnostic imaging of the temporomandibular joint

Because of the anatomic complexity of the temporomandibular joint (TMJ) and its proximity to the base of the skull, temporal bone, mastoid air cells, and auditory structures, imaging of the joint structures can be problematic. Imaging studies should aid the clinician in diagnosis and surgical planning. The choice of imaging modality should be based on history and physical exam. Consideration should be given to the amount of radiation, invasiveness of the exam, ability to obtain the study, and cost. The study that is able to best answer the clinical question while maximizing cost effectiveness should be utilized.

### Plain film, tomograms, and orthopantomogram radiography

Plain films, tomograms, and orthopantomogram (panoramic) studies provide good osseous detail of the TMJ, with minimal radiation, and are easily obtained. As such, they are often an excellent choice for initial evaluation of TMJ pathology.

Standard transcranial (lateral oblique) views provide a global view of bony architecture of the articular surfaces.

If possible, a submental vertex film can be taken to allow the lateral oblique transcranial projection to be angled directly through the long access of the condyle. This improves the image quality and also allows standardization of subsequent transcranial views. With the exception of emergency room visits for trauma or dislocation, tomograms or panoramic radiographs have largely replaced these studies.

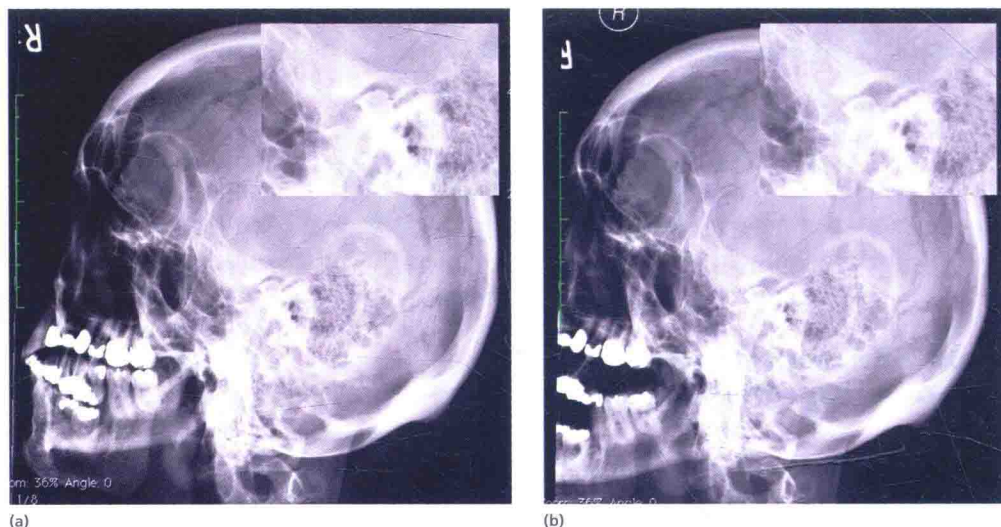
Tomography has been widely available since the early 1940s and provides finer detail for the examination of osseous abnormalities than detected by plain film techniques. The angle-corrected tomograms for sagittal tomography are recommended so that the sectioning is always perpendicular to the long axis of the condyle. This gives a truer picture of the condyle position, gives the best evaluation of erosion and osteophyte formation, and allows subsequent comparative studies to be performed by use of a standard method. The angle can be determined by measuring the angle between the condylar axis and a horizontal baseline on a submental vertex view.

Orthopantomogram radiographs have been described as “curved tomograms.” They are, in fact, laminograms of a single





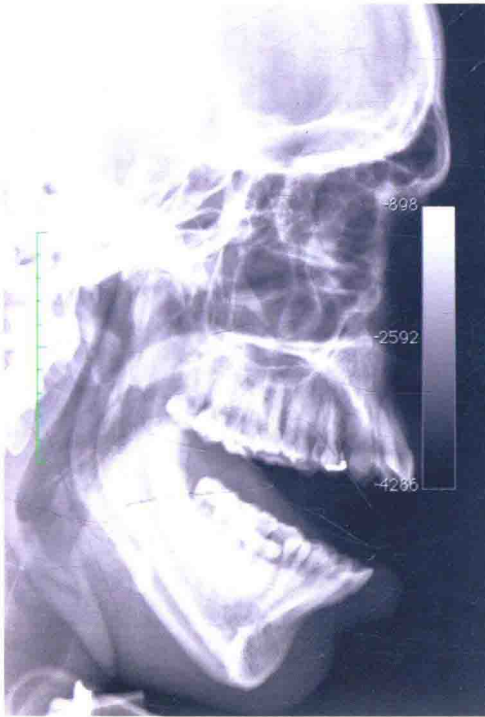
**Figure 2.1** Transcranial radiograph, demonstrating the limitations of this study. Note the overlap of adjacent structures with the glenoid fossa and mandibular condyle.



**Figure 2.2** (a) Later oblique in the closed mouth position, note mandibular condyle seated in the glenoid fossa (inset). (b) Lateral oblique in open mouth position, note translation of TMJ condyle (inset).

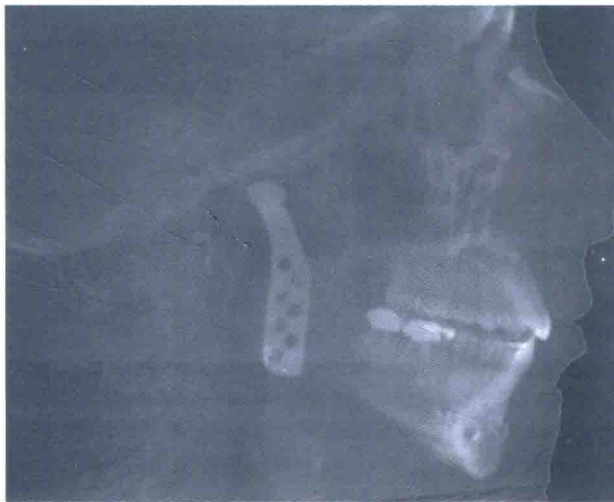
plane. This study provides osseous imaging of the condyle and fossa, includes both joints, as well as the entire mandible for comparison of symmetry. Disadvantages include “ghost” images, distortion (~20%), and less detail when compared to angle-corrected condylar

tomograms. Newer units allow for separate positioning of right and left joints, creating more correct placement of the condyle in the zone of focus, improving resolution. Some units are able to produce tomograms, allowing increased anatomic detail of the condyle.



**Figure 2.3** Lateral cephalogram showing bilateral dislocation of the temporomandibular joints. Note anteriorly positioned mandible and open bite.

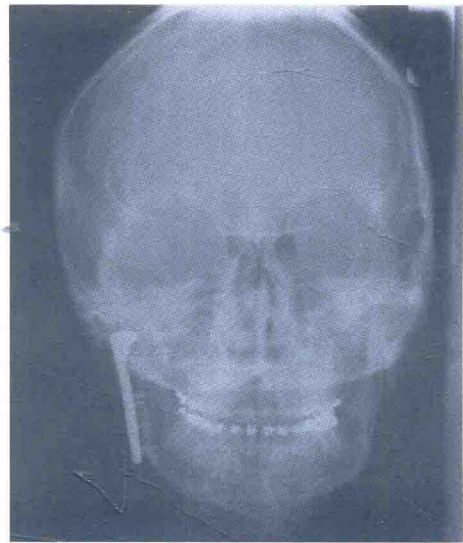
Plain films and tomographic images are beneficial in assessing osseous changes in the condyle and eminence. However, the use of these films to assess condylar position with any accuracy is questionable at best. Several studies have shown that the position of the condyle, as depicted in these radiographic techniques, is of little clinical significance. Open- and closed-mouth tomographic views can provide valuable information with regard to condylar translation. Although it has been postulated that during normal range of motion the greatest convexity of the condyle reaches the greatest convexity of the articular eminence, several studies have shown that a majority of patients actually can translate beyond the greatest convexity of the articular eminence without subluxation, dislocation, or any symptoms. These studies can diagnose restricted range of motion but do not provide enough information to determine the etiology of that restriction.



**Figure 2.4** Postoperative lateral cephalogram. Study demonstrates good condylar prosthetic position and occlusal relationship.



(a)



(b)

**Figure 2.5** (a) Preoperative posterior–anterior (PA) skull film. Note facial asymmetry involving the maxilla and mandible. (b) Postoperative PA demonstrating achievement of facial symmetry. Condylar prosthesis is well aligned. Note maxillary hardware from Le Fort I procedure.



(a)



(b)

**Figure 2.6** (a) Patient positioned for angle-corrected temporomandibular joint tomograms. Source: Quinn 1998, figure 2.3a, p. 7. Reproduced with permission of Elsevier. (b) Angle-corrected tomogram of right temporomandibular joint.