

# Idiopathic Condylar Resorption

## What Should We Do?



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### KEYWORDS

- Idiopathic condylar resorption (ICR) • Progressive condylar resorption (PCR)
- Temporomandibular joint replacement (TMJR)

### KEY POINTS

- Idiopathic condylar resorption (ICR), alternatively called progressive condylar resorption, is an uncommon aggressive form of degenerative disease of the temporomandibular joint (TMJ) seen mostly in adolescent and young women.
- The orthodontist is likely to have contact with patients afflicted with ICR in the following 2 contexts. The first include patients who spontaneously manifest ICR independent of surgical intervention and second, those who develop ICR during orthodontic treatment or in retention.
- TMJ intraarticular pathologic disorders, such as ICR, must be considered as pathologic entities in dental circles the same way our orthopedic colleagues discuss all other joint pathology. Failure to do this only exacerbates the problems associated with TMJ disorders in general for patients, clinicians, insurance companies.

### INTRODUCTION

Idiopathic condylar resorption (ICR), alternatively called progressive condylar resorption (PCR), is an uncommon, aggressive form of degenerative disease of the temporomandibular joint (TMJ) seen mostly in adolescent and young women.<sup>1–3</sup> This disorder is very rarely seen in men. Constitutional risk factors include hormonal imbalance (↓estrogen, ↓17β-estradiol) and nutritional status (↓ Vitamin D, ↓ dietary Omega-3 fatty acids).<sup>4,5</sup> Bruxism, third molar extractions, orthodontics, and orthognathic surgery have been hypothetically implicated as resulting in compressive TMJ overloading and are thought to be possible causes of ICR.<sup>6</sup> In patients with ICR the intrinsic adaptive capacity of their joints to withstand mechanical loads

is exceeded by functional demands; essentially they are a vulnerable subset of the population.<sup>7</sup> The rarity of this disease is shown in a survey of 59 orthodontists; only 56 cases of ICR were reported out of the thousands of patients seen in their practices.<sup>1</sup>

### PATHOPHYSIOLOGY

ICR is best described as a localized pathologic disorder of the TMJ characterized by lysis and repair of the articular fibrocartilage and underlying subchondral bone.<sup>3</sup> This condition leads to loss of condylar bone mass, decrease of mandibular ramal height, steep mandibular and occlusal plane angles, and apertognathia. Most of the pathologic process is localized to the mandibular condyles.

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The active phase of ICR often is associated with limited jaw opening and TMJ pain, followed by condylar head flattening. This alteration may eventually develop a compatible articulation with a remodeled posterior articular eminence slope permitting redistribution of functional loads and restoring mandibular mobility.<sup>3</sup>

ICR occurring before the completion of growth results in a shorter mandibular condyloid process, ramus and body, compensatory growth at the gonial angle (causing an antigonial notch deformity), and an increase in anterior facial vertical dimension. As ramus height decreases, there is compensatory increase in the coronoid process length and anterior open bite development. A tendency for a reduction in airway size secondary to decreased mandibular growth in the immature skeleton, as well as in the patient who has completed growth, leads to progressive mandibular retrusion and the risk of developing sleep apnea.<sup>3</sup>

## HISTORY

A careful history can reveal the probable diagnosis of ICR. A report of a sudden change in occlusion is nearly pathognomonic of ICR. Unfortunately, this change may occur during orthodontic treatment, when it easily can be misinterpreted as being due to unfavorable growth, tongue thrust, or it might be regarded as an adverse response to treatment mechanics.

A history of autoimmune and collagen diseases should be part of the historical questioning. A history of TMJ discomfort and disc displacement may be a factor, because several patients with ICR report pain or other TMJ disorder symptoms and have displaced discs on imaging.<sup>8</sup> It should be remembered that disc displacement occurs in a significant number of asymptomatic individuals and disc displacement may not lead to TMJ pathology.<sup>9-11</sup> In a survey of a group of orthodontists only one-half of the ICR cases reported TMJ discomfort.<sup>1</sup> A history of facial trauma, especially when the TMJ is involved, is important as a possible cause of condylar resorption.<sup>1,6</sup> Fortunately, only rarely does a trauma case evolve into ICR.

## IMAGING

The orthopantomogram (OPG) is the least expensive imaging modality for gross evaluation of the mandibular condyle. Pathognomonic imaging signs such as loss of condylar bone mass, flattening of the anterior or superior aspect of the condyle, as well as a distal inclination of the

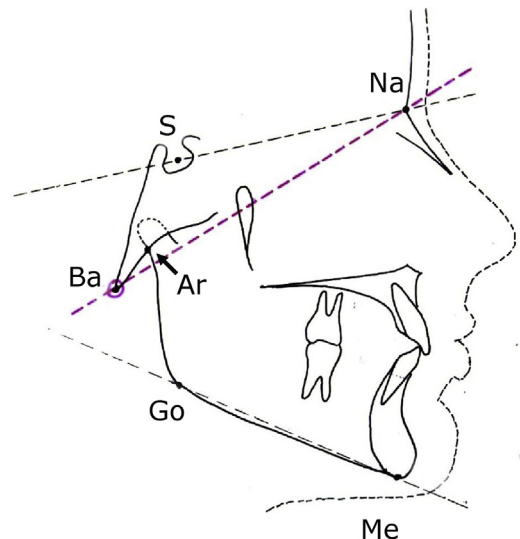
condylar neck can be easily observed on an OPG.<sup>12</sup>

A cephalogram will exhibit a decreased posterior facial height, increased anterior facial height, increased overjet, and anterior open bite. Serial cephalograms taken during the active stages of ICR using the suggested superimposition on basion along the basion-nasion plane will show a more mesial position of articulare<sup>1</sup> (Fig. 1). Serial cephalometric tracings of a case of ICR superimposed as discussed earlier show the typical skeletal changes as well as the anterior movement of articulare relative to basion (Fig. 2).

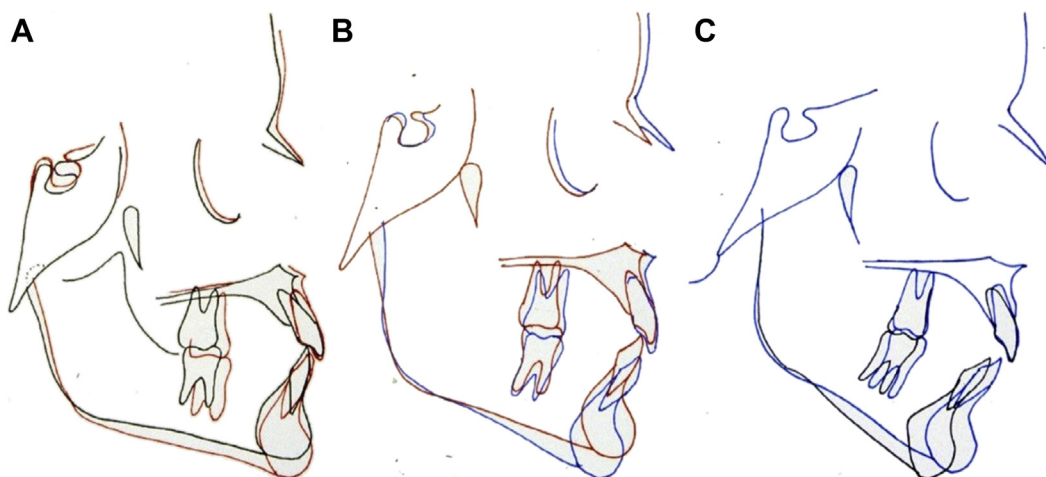
Cone beam computed tomography (CBCT) is definitive as it permits a 3-dimensional evaluation of the condyle and condylar degeneration, for example, subchondral Ely cyst formation, erosion, flattening and loss of the dense cortical layer, as well as subcortical bone loss<sup>3</sup> (see Fig. 2).

MRI is the preferred technique for investigation of the soft tissues of the TMJ, disc derangement, and inflammation. The T1-weighted MRI is helpful to identify disc position, the presence of alteration in bone, and soft tissue anatomy, whereas the T2-weighted MRI is helpful to identify any inflammatory response as well as mandibular condyle bone marrow edema.<sup>2,3</sup>

Bone scintigraphy, using technecium-99, can be used to assess whether there are any active bony



**Fig. 1.** Cephalometric tracing using nasion (Na) to basion (Ba) plane with the recommended superimposition point at basion. With active ICR, superimposed tracings will often show articulare (Ar) moving in an anterior direction.<sup>1</sup> Articulare is the point where the posterior of the ramus crosses the Na-Ba plane. It represents the movement of the condyle, which is often difficult to trace especially in advanced ICR cases.<sup>1</sup>



**Fig. 2.** Cephalometric tracings of progressing stages of ICR superimposed on the nasion-basion plane at basion. (A) Preorthodontic treatment at age 10 years, 3 months, traced in black. Occlusion class I deep bite with no signs of ICR. Postorthodontic treatment at age 13 years, 4 months, traced in red. Early stages of ICR as articulare advanced anteriorly relative to basion. Growth masked this early stage of ICR. (B) Tracing at 13 years, 4 months in red and at 14 years, 3 months in blue. Mandibular rotation results in anterior open bite. Condylar resorption is demonstrated by advancement of articulare. (C) Tracing at 14 years, 3 months in blue and age 15 years, 10 months in black. The mandible has shortened and has continued clockwise rotation resulting in severe Class II open bite. (From Handelman CS, Greene CS. Progressive/idiopathic condylar resorption: an orthodontic perspective. *Sem Ortho.* 2013;19:60; with permission.)

changes; but its specificity has been reported as not sufficient to assess state of stability/remission of those changes.<sup>3</sup>

### PRELIMINARY DIAGNOSIS

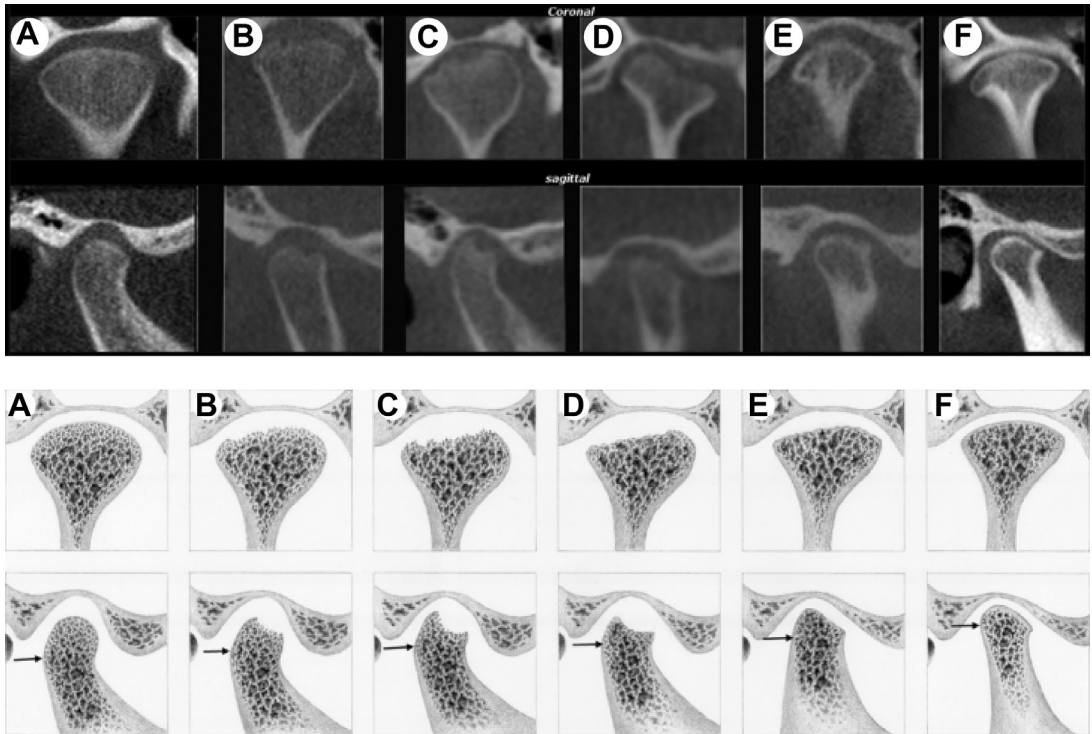
Early diagnosis of ICR should include a careful examination of the mandibular condyle and condyloid process on the screening OPG. Signs of bony condylar changes or condyloid process shortening may be present despite absence of clinical symptoms. The suspicion and recognition of these imaging changes, plus awareness of any clinical sign and symptoms, may be an indication for the need for more sophisticated imaging (CBCT, MRI, bone scintigraphy), blood testing, and consultation. Blood testing to rule out high inflammatory arthritic diseases include erythrocyte sedimentation rate, C-reactive protein, antinuclear antibody, rheumatoid factor, and anticyclic citrullinated peptide. Vitamin D and  $17\beta$ -estradiol levels should also be examined.<sup>4-6,13</sup> CBCT is pathognomic for normal, early degenerative change, advanced changes, and repair once active ICR goes into remission<sup>3</sup> (Fig. 3).

### ORTHODONTIC MANAGEMENT

The orthodontist is likely to have contact with patients afflicted with ICR in the following 2

contexts. The first include patients who spontaneously manifest ICR independent of surgical intervention. The most troubling are those who develop ICR during orthodontic treatment or in retention. These patients are almost always young adolescent women, whereas others are afflicted in their late teens or early twenties. Their clinical history shows that their occlusion was acceptable in the past, but within a relatively brief time period they have deteriorated. The second group includes patients who have undergone orthognathic surgery for correction of any one or more of the following conditions: anterior open bite, mandibular retrognathia, or long anterior face height. Following surgery, the intermaxillary correction seems to be successful, but by the third to sixth month afterward the correction starts to fail to a variable extent. The extent of the relapse varies from minimal to almost return to the presurgical state.

Do these 2 groups of patients have different problems, either clinically or pathophysiologically? Or are they the same, only manifested at somewhat different ages and under different circumstances? In both cases, most of these patients share similarities in sex, age, malocclusion, skeletal pattern, and condylar pathology. With the exception of subjects with known medical or traumatic causality,<sup>13</sup> these patients are described as having an “idiopathic” problem (ie, ICR).



**Fig. 3.** Imaging stages of ICR. CBCT TMJ images (*top*) and anatomic images (*bottom*) displayed in paracoronal and parasagittal plane. (A) Normal, (B) beginning of active destructive stage, (C) continuing destructive stage, (D) beginning of repair stage, (E) advanced repair stage, (F) stable stage. Arrows pointing to the mandibular condyle. (From Hatcher DC. Progressive condylar resorption: pathologic processes and imaging considerations. *Sem Ortho.* 2013;19:104; with permission.)

### **Sex and Age**

ICR is a disease of young women in their pre-teens or early twenties. Many diseases have a higher incidence in either men or women. It is unusual for a disease to be clustered almost completely within one gender when the sexual organs are not directly involved. Arnett and colleagues<sup>4-6</sup> have made a case for low serum 17  $\beta$ -estradiol as a major factor in progressive condylar resorption. They state that the use of oral contraceptives and abnormal menstrual cycles are often seen in women with severe condylar resorption.

But why should there be a preponderance of adolescent and young women in the ICR population? The premenstrual woman may have insufficient circulating estrogen to initiate condylar pathology, but then there is the onset of menses. The age of expression of ICR is in adolescent and young women up to the late twenties. Interestingly, there seems to be an unexplained "burnout" of the resorption process in afflicted individuals sometime in the mid-twenties. However, the involved joints will always be subject

to reactivation of the destructive phase when exposed to excessive functional demands even into adulthood.<sup>3</sup> It is best to consider the involved joints as in "remission" rather than healed.

Can the preadolescent facial type and occlusion predict later ICR? Not necessarily. **Fig. 2** illustrates a subject who during adolescence developed ICR/PCR, but as young girl had a Class I malocclusion without a hint of her future disease.

### **Mechanical Loads**

The healthy TMJ that undergoes natural remodeling can withstand and adapt to heavy mechanical loads that are frequently experienced, including parafunctional habits such as nocturnal bruxism, orthodontic procedures such as wearing elastics, and orthopedic appliances such as Herbst or chin cup. However, a certain subset of adolescent and young adult women seem to be susceptible to developing degenerative joint disease that progresses to condylar resorption when their TMJs are exposed to excessive mechanical loading.<sup>6</sup> Orthodontic treatment and

third molar extractions have been indicted as possible causes of ICR/PCR.<sup>6</sup> Statistics indicate that this is a very rare disease<sup>1</sup> and a large percentage of the young have had orthodontic treatment and/or third molar removal. Therefore, it is problematic to assign cause of a rare disease to a common experience. However, in those rare subjects whose condyles are undergoing an early, often undetected, stage of ICR/PCR, orthodontic treatment and/or third molar extractions may overwhelm the adaptive capacity of their vulnerable condyles. Even healthy joints cannot withstand extreme mechanical loads that exceed their adaptive capacity, for example, severe trauma.

### ORTHOGNATHIC SURGERY AS A RISK FACTOR

Orthognathic surgery for the correction of the Class II open bite malocclusion usually involves maxillary impaction via a LeFort I osteotomy to induce mandibular closing rotation, combined with mandibular advancement via bilateral sagittal split osteotomies (BSSO). Both surgeries will cause a sudden repositioning of the condyles in the fossae and thereby alter both the direction and the magnitude of the mechanical load in the TMJs.<sup>6,12</sup> In most patients following surgery the joints will remodel and adapt to this change; but in some patients the remodeling capacity of their TMJs is exceeded by the functional demands of these sudden anatomic changes, and their condyles resorb.<sup>6</sup>

Arnett and colleagues<sup>6</sup> have demonstrated that the use of bicortical screws to fixate the mesial and distal segments during BSSO can rotate the condylar segments either laterally or medially in the glenoid fossa. This torquing of the condyle could initiate condylar resorption. To minimize torquing they suggest using titanium bone plates adapted to the outer cortical surfaces of the 2 segments with unicortical screw fixation to minimize this problem. They also point out that overseating the condyle in the fossa during BSSO can cause compression resulting in dysfunctional remodeling of the joint.<sup>6</sup>

In a study by Peacock and colleagues,<sup>14</sup> the incidence for condylar resorption following maxillary surgery for correction of Class II open bite malocclusions was less than after surgeries involving both jaws (9% compared with 23%). However, most severe Class II open bite patients will benefit from having bimaxillary surgery as well as advancement genioplasty in order to maximize facial aesthetics. Hoppenreijts and colleagues<sup>12</sup> also demonstrated that the initial correction can relapse due to condylar resorption

by the sixth month, and this resorption can continue for up to 3 years.

### DIAGNOSIS OF THE PATIENT WITH IDIOPATHIC CONDYLAR RESORPTION

#### *Occlusal Appliances: Diagnostic Aspects*

Occlusal appliances used only at night time are suggested as a joint stabilizing modality in ICR cases when there is joint pain and dysfunction as well as before orthognathic surgery.<sup>6</sup> An often-overlooked use is its potential as a diagnostic tool for determining cessation of the resorptive process. Patients suspected of having ICR should be fitted with a maxillary occlusal appliance with contact registered on all the mandibular teeth. If the lower incisors no longer register contact at a future evaluation, this indicates further joint degeneration and active disease.<sup>1</sup> An occlusal appliance should routinely be placed following orthognathic surgery and orthodontic treatment of patients with ICR at the time of retention both to reduce the forces on the TMJ and to evaluate stability of the correction.<sup>1</sup>

#### *Idiopathic Condylar Resorption Treatment Options: What to Do*

The following is a listing of treatment options that depend on severity, activity stage of ICR, and patient wishes.

*No treatment:* this is a possible option when ICR no longer is active, especially when the disfigurement of the facial soft tissue is moderate and acceptable for the patient. Usually the occlusion is only on the most distal molars with a variable anterior open bite. A full coverage occlusal appliance should be used at night to manage pain and avoid excessive forces on the TMJ.

*Maintenance during active ICR:* no active orthodontic or surgical treatment should be performed as this could accelerate condylar resorption. A full coverage occlusal appliance is used to manage the forces on the TMJ and for diagnosis of active disease. Follow-up at 6-month intervals with serial cephalometric radiographs (superimpose on the nasion-basion plane at basion). CBCT scans are taken annually to observe condylar anatomy to determine if the head of the condyle is in the active, destructive phase, varying stages of repair or the healed stable stage (see **Fig. 3**). It is best to wait 6 months to 1 year before treatment is initiated after the stable stage is achieved.

*Orthodontic treatment:* this is contraindicated during the active phase of ICR. First, it could accelerate condylar resorption and second it would expose the orthodontist to litigation if the

ICR progresses. Once the ICR is in remission, orthodontic treatment without follow-up jaw surgery is feasible in only a few patients with ICR—those with moderate skeletal and occlusal discrepancies. Their condylar resorption usually started after growth completion and their condition may better be described as “degenerative joint disease.”

Most patients with ICR present with considerable condylar destruction with resulting soft tissue disfigurement and extreme Class II open bite malocclusions and require comprehensive orthognathic surgical procedures. In all cases before surgery orthodontic treatment is required to align the teeth in both jaws for maximum occlusion following repositioning of one or both jaws.

*Orthognathic surgery:* surgery places an enormous functional demand on the compromised adaptive capacity of even the healed condyle. One approach is to delay surgery until the patient is in the mid-twenties when the so-called burn out stage has occurred. Variable postsurgical relapse may still occur. Patients with the usual disfiguring malformation associated with ICR often wish correction before the college years when the disease may still be active. There are several papers that indicate that 30% of women following orthognathic surgery for Class II open bite develop postsurgical relapse of variable amounts of the correction.<sup>15–20</sup>

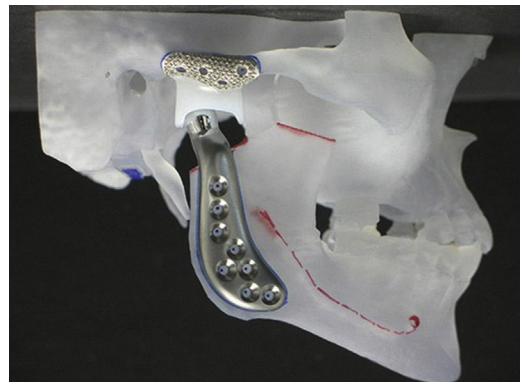
*Medical management with orthognathic surgery:* Arnette and Gunson have proposed pharmacologic and physiologic control of the resorptive process for a period of time both before and after orthognathic reconstruction. They recommend antiinflammatory medication such as the nonsteroidal antiinflammatory drugs (Naproxen, Celebrex, Feldene), vitamin D and calcium supplementation (both of which are known to increase bone density), and an antioxidant diet. When pursuing the medical management route proposed by Arnette and Gunson,<sup>4–7</sup> it is essential that a colleague rheumatologist with an understanding of this pathology prescribe and monitor any biological medication such as methotrexate or etanercept used as part of this regimen.<sup>18,19</sup> Gunson and Arnette have reported success in individual cases using these procedures.<sup>5</sup> The advantage of medical management of TMJ surgery is lifetime maintenance of the patient’s own TMJ.

*Surgical management of ICR using total alloplastic temporomandibular joint replacement (TMJR):* the presence of an adverse mechanical and biological environment promoting osteoclastic pathologic activity over osteoblastic activity as found with ICR compromises the surgical options of

autogenous reconstruction with a costochondral graft,<sup>14</sup> orthognathic surgery,<sup>15–19</sup> and/or distraction osteogenesis.<sup>21</sup>

Wolford and Gonçalves reported a protocol using salvageable intraarticular discs. The protocol includes removing the tissue pathology from the joint, repositioning and stabilizing the disc to the condyle with a Mitek anchor (Mitek Surgical Products, Westwood, MA), bimaxillary surgery with counterclockwise rotation of the maxillomandibular complex, and other adjunctive procedures such as turbinectomy and genioplasty. However, these investigators stated that the results using this protocol are best when it is used within 4 years of ICR signs and symptoms and most importantly, when the articular disc is intact. After 4 years, discs in this disease may become significantly deformed or fragmented and are unsalvageable. In such cases, the investigators recommend alloplastic TMJ replacement.<sup>2,22</sup>

It seems that an ICR surgical management option that does not depend on the compromised mechanical and biological adaptive capacity of the TMJ and surrounding tissues should be considered. Total alloplastic TMJ replacement, because it is a biomechanical rather than biological solution to the management of anatomically distorted dysfunctional joints resulting from pathology or end-stage disease, provides such an option. Individually customized patient-fitted TMJR fossa and ramus (condyle) components are designed and manufactured from a stereolithic model generated from the patient’s protocol computed tomographic scan data to mimic the anatomic contours of the structures they are intended to replace (Fig. 4).



**Fig. 4.** Image of custom TMJR on stereolithic model. Fossa component is ultrahigh molecular weight polyethylene bearing surface backed by a commercially pure titanium mesh. Ramus component is titanium alloy with a cobalt chrome molybdenum condylar head. Screws are titanium alloy (TMJ Concepts, Ventura, CA).

**Table 1**  
Patients with ICR managed surgically between 2001 and 2010

Patient	Diagnosis	Treatment	Result	Treatment	Result	Management	Status
DT	CI II	Ortho BSSO	ICR	CCG	PCR	BTMJR	LTFU
CP	CI II	Ortho BSSO	ICR	Refused Tx			LTFU
LS	CI II	Ortho BSSO	ICR	CCG	PCR	BTMJR	Stable
PP	ICR			OA		Ortho BTMJR	Stable
TD	CI II	Ortho BSSO	ICR	OA	PCR	Ortho BTMJR	Stable
YF	ICR			OA		OA	PCR
SC	ICR					BTMJR	Stable
JL	ICR					BTMJR	Stable
TM	ICR					BTMJR	Stable
JF	ICR					BTMJR	Stable
EF	ICR	Ortho		Refused Tx			LTFU
KP	ICR	Le Fort I BSSO	PCR			BTMJR Genio	Stable
MS	ICR					Ortho BTMJR	Stable
NC	ICR					LeFort I BTMJR	Stable
AI	CI II	Ortho BSSO	PCR			LeFort I BTMJR	Stable

All bilateral alloplastic temporomandibular joint replacement cases remain stable without revision to date.

*Abbreviations:* BTMJR, bilateral alloplastic TMJ replacement; CCG, costochondral (rib) graft; Genio, genioplasty; LTFU, lost to follow-up; OA, occlusal appliance; Ortho, orthodontics; Tx, treatment.

At implantation, these TMJR components are adapted and fixed in a stable and close fashion to the bony surfaces of the temporal bone and mandibular ramus.<sup>23-26</sup>

There is always a component of counterclockwise mandibular rotation in the surgical management of ICR. Expecting an avascular autogenous rib graft or an ICR-compromised condyloid process



**Fig. 5.** This is a 15-year-old who presented from her orthodontist with a chief complaint of increasing bilateral temporomandibular joint pain and increasing anterior open bite. Her past medical history was unremarkable except for dysmenorrhea managed with birth control medication. Rheumatoid work-up was negative.



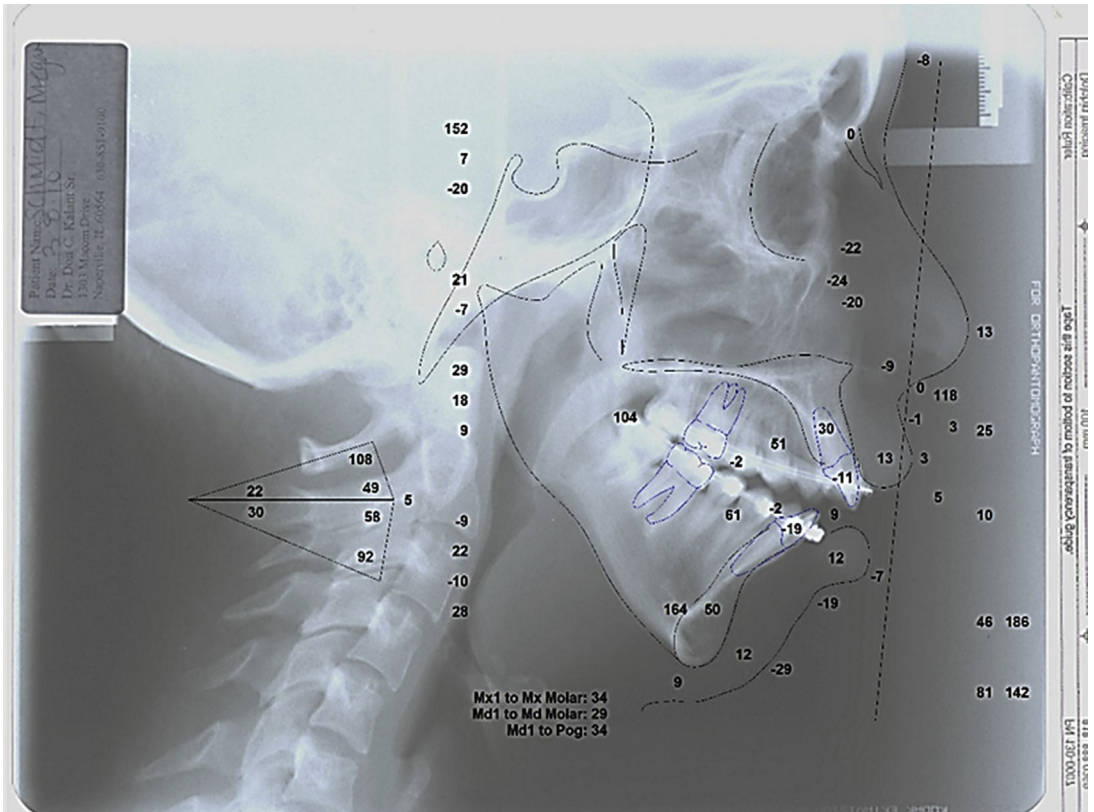
**Fig. 6.** Orthopantomogram demonstrated bilateral condylar resorption.

remnant after orthognathic surgery or distraction to withstand the muscle and other soft tissue forces generated by such movements under functional loading short or long term seems fraught with the potential for relapse if one considers the effects of muscle forces on bone.<sup>27</sup> The long-term stability using TMJR in the management of ICR cases is well documented (Table 1).<sup>24,28-30</sup>

The relative disadvantages of TMJR include (1) cost of the device; (2) material wear and failure;

(3) uncertainty about long-term stability; and (4) the fact that alloplastic implants will not follow a patient's growth.<sup>31</sup>

Considering the demographics of ICR/PCR, longevity of any TMJR must be an important consideration. Because this is a biomechanical rather than a biological solution, future planning must be made for revision surgery to remove scar tissue from the articulating components of the implant. Eventually replacement of the implant

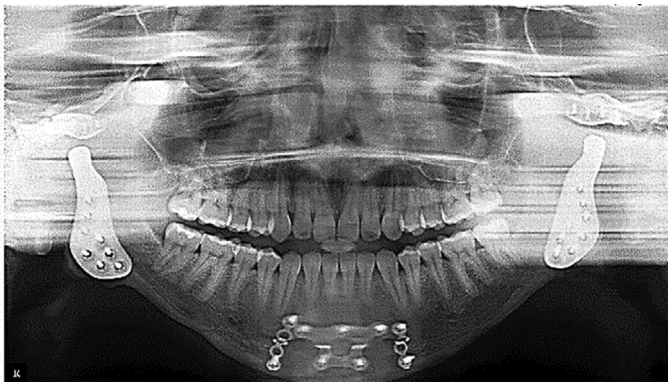


**Fig. 7.** Cephalometric imaging revealed steep mandibular and occlusal plane angles, anterior open bite and chin deficiency.

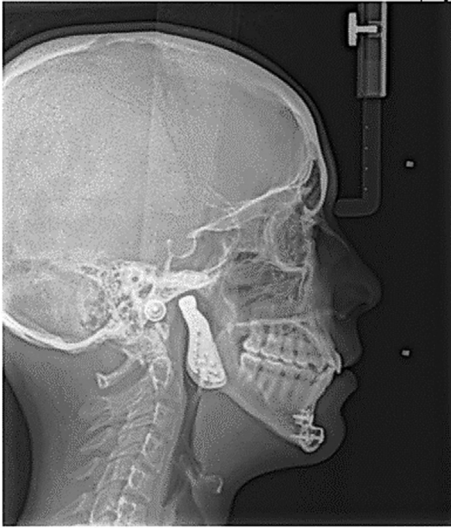




**Fig. 8.** A diagnosis of progressive condylar (PCR) resorption was made and a management plan was designed to include bilateral temporomandibular joint replacements with patient-fitted alloplastic prostheses (TMJ Concepts, Ventura, CA) as well as an advancement genioplasty. 6 years post-operatively, she has good mandibular function, facial form, stable and repeatable occlusion and no complaints of joint pain.



**Fig. 9.** 6-year post-operative orthopantomographic images.



Lateral Ceph DR

**Fig. 10.** 6-year post-operative cephalometric image reveal improved maxillomandibular relationships.

over time due to material wear and/or failure may be required. At present, patients are advised that these devices may have a functional life span of 10 to 15 years based on the orthopedic experience in total joint arthroplasty<sup>32,33</sup> and recent TMJR long-term outcomes results.<sup>25–28,34–46</sup>

### CASE EXAMPLE

A 15-year-old girl presented from her orthodontist with a chief complaint of progressive bilateral TMJ pain and increasing anterior open bite over the past 2 years (**Fig. 5**). Her past medical history was unremarkable except for dysmenorrhea managed with  $\beta$ -estradiol medication. Rheumatoid workup was negative.

Physical examination revealed decreased maximal interincisal opening (MIO), mandibular retrognathia, anterior open bite, steep mandibular and occlusal planes, and bilateral TMJ and masticatory muscle pain to palpation. Orthopantomogram demonstrated loss of condylar bone stock bilaterally (**Fig. 6**). Cephalometric imaging confirmed the clinical findings (**Fig. 7**).

A diagnosis of progressive condylar resorption was made and a management plan was designed to include bilateral TMJ replacements with patient-fitted alloplastic prostheses (TMJ Concepts, Ventura, CA) as well as an advancement genioplasty.

Six years postoperatively, she has good mandibular function, facial form, stable and repeatable occlusion, and no complaints of joint pain (**Fig. 8**). Orthopantomogram (**Fig. 9**) and cephalometric imaging demonstrate good

positioning of the TMJ replacement components, good facial form, as well as stable skeletal and occlusal relationships (**Fig. 10**).

### SUMMARY

Long-term successful outcomes of both nonsurgical and surgical ICR management ultimately rely on the stability and strength of pathologically affected local TMJ articular and soft tissue elements.<sup>24</sup> However, Mehra and colleagues<sup>29</sup> and Alsabban and colleagues<sup>47</sup> recently have stated that ICR management is controversial and that there are to date no published randomized clinical trials to compare the outcomes of the various nonsurgical and surgical ICR treatment options.

Finally, it should be emphasized that TMJ intraarticular pathologic disorders, such as ICR, must be considered as pathologic entities among dentists and specialists the same way our orthopedic colleagues discuss all other joint pathologies. Failure to do this only exacerbates the problems associated with TMJ disorders in general for patients, clinicians, insurance companies, etc., because they do not consider TMJ pathology or orthopedic pathology, but rather that TMJ pathologic disorders are purely dental in nature.

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