Surgical Management of Idiopathic Condylar Resorption

Orthognathic Surgery Versus Temporomandibular Total Joint Replacement

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KEYWORDS

• Idiopathic condylar resorption • Costochondral graft • Orthognathic surgery
• Total joint replacement

KEY POINTS

- Idiopathic condylar resorption (ICR) classically affects young women with a Class II malocclusion and high mandibular plane angle.
- It results in progressive reduction in condylar size, and alteration of condylar contour and shape; sometimes accompanied by symptoms of pain and functional limitations.
- The resulting facial deformity can cause disability due to the open bite malocclusion, unaesthetic profile, and difficulty with mastication and speech.
- Orthognathic surgery alone for ICR should not be done until clinical examination and diagnostic investigation have established that the active changes in the condyles have stopped.
- Temporomandibular joint replacement with alloplastic prosthesis alone, or combined with orthognathic surgery, offers a definitive treatment option for patients with final-stage ICR or persistent condylar activity. It eliminates the morbidity of a second surgical site, and the risk of undergrowth or overgrowth that can occur with a costochondral graft.

INTRODUCTION

Idiopathic condylar resorption (ICR) is an acquired disorder of the temporomandibular joint (TMJ) classically affecting young women between 15 and 40 years of age, which causes progressive reduction of condylar volume leading to alteration of contour and shape. It can be asymptomatic or present with symptoms of joint pain and dysfunction. Occasionally, it can be unilateral and affect men.[1–5] Although some patients have only minimal functional limitations, the resulting changes in facial appearance and the open bite malocclusion often lead to difficulty with chewing and speech, as well as airway and breathing disorders in severe cases.

The correction of the facial skeletal deformity and malocclusion in patients with ICR can be challenging because of the unpredictable duration of the condition and the variable extent of

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the condylar changes. Operative intervention has to be selected and timed appropriately, after clinical examination and diagnostic investigations have collectively established that condylar activity has either ceased spontaneously or is to be arrested by the surgical procedure.[6] The ultimate goal of treatment for patients with ICR is to achieve a stable occlusion without relapse, adequate jaw function, and balanced facial proportions.

The surgical treatment of ICR remains controversial and there are only a few case series and/or meta-analyses to date discussing the various options. Generally speaking, the treatment options include some form of orthognathic surgery with or without TMJ surgery.[7–14] In this article, we discuss the controversies in the management of ICR along with the pros and cons of 2 surgical options: orthognathic surgery alone or orthognathic surgery and total joint replacement. The etiology of ICR, its clinical presentation and diagnosis, and the investigations required before surgical treatment also are briefly reviewed.

HISTORY AND ETIOLOGY

Reports of ICR were published in 1961 by Burke,[15] in 1977 by Rabey[16] and Norman,[17] and by Lanigan and colleagues[18] as a case report of a patient with a collagen disorder in 1979. Since the initial description, several others have reported on this condition, often diagnosed after unexplained relapse after orthognathic surgery.[18–22] The treatment of ICR has evolved in the past 2 decades with the advent of alloplastic reconstruction of the TMJ.[23–25] The exact cause or stimulus that initiates or propagates the process is unknown, although many contributing factors have been suggested. It has been reported to occur after increased mechanical loading of the TMJ following orthodontic treatment, orthognathic surgery, trauma, internal derangement, occlusal therapy, or parafunctional habits.[2,3,19,26–30] Wolford and Cardenas[29] have suggested that the condylar resorption in patients with ICR is mediated by morphologic and secretory changes in the hypertrophic bilaminar zone of the TMJ disk. Others have argued that avascular necrosis might play a role in the pathogenesis of ICR.[31] Hormonal mediation based on the presence of estrogen receptors in the human TMJ and the influence of estrogen and prolactin on bone response have also been proposed as etiologies.[32–35] In most cases, however, no clear identifiable cause is evident and hence the condition is generally referred to as ICR.

EPIDEMIOLOGY AND CLINICAL PRESENTATION

ICR, also sometimes referred to as progressive condylar resorption or adult ICR in the literature, occurs infrequently, with a reported prevalence of 1:5000 among individuals presenting for orthodontic treatment.[30] Condylar resorption as a complication among all individuals undergoing orthognathic surgery is reported to occur in the range of 2% to 5%, and, within the subset of patients with Class II malocclusion with steep mandibular plane angles, its incidence is even higher (19%–31%).[30] There is a high female predilection for this condition and a peak incidence between the ages of 15 to 35 years (average age: 20.5 years), and a male-to-female ratio of 1:9. The early symptoms and signs of condylar resorption are subtle; they may or may not be present before orthodontic treatment or orthognathic surgery, but become more apparent after treatment. Resorption is usually slow, approximately 1.0 to 1.5 mm per year, so it initially may be difficult to identify clinically, especially if the orthodontist is compensating for the ongoing skeletal changes with counteracting dental movement(s). As the condylar resorption progresses, individuals classically present with a gradually retruding chin, anterior open bite, loss of posterior facial height, clockwise rotation of the mandible, and development of retrognathia with or without associated symptoms of TMJ pain and functional limitations. It is not uncommon to find that patients with ICR give a history of being managed by multiple providers in the medical and dental specialties. **Fig. 1** demonstrates the typical clinical and radiographic presentation of a patient with early ICR.

RISK FACTORS FOR CONDYLAR RESORPTION

The risk factors can be broadly classified into 2 categories: patient-related or surgery-related (**Box 1**). Patient risk factors include age, gender, physiology, medications, systemic disorders, mandibular anatomy, bone density, and dental occlusion. Among the orthognathic surgery population, young women with a Class II malocclusion, mandibular retrognathism with an anterior open bite, high or wide mandibular plane angles, a low posterior-to-anterior facial height ratio, and a slender posteriorly inclined condylar neck are at known to be at high risk for ICR.[22,36,37] Condyles with preexisting radiological signs of osteoarthritis also may be at higher risk for progressive resorption.[36] O'Ryan and Epker[38] evaluated the morphologic changes in the condyle and studied the