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# Total bilateral TMJ reconstruction for pain and dysfunction: Case report

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ABSTRACT

*INTRODUCTION:* Temporomandibular disorders encompass a set of clinical conditions that affect the temporomandibular joint, the masticatory muscles and the associated tissues. Many therapeutic alternatives can be considered, being divided into non-invasive, minimally invasive and invasive interventions. This work aims to report a case of inflammatory joint pain and dysfunction treated with bilateral TMJ full reconstruction with alloplastic prosthesis stock.
*CASE REPORT:* Patient D.J.S.S., female, 41 years old, hypertensive, for six years had constant pain in TMJ bilaterally, with limitation of mouth opening, with a clinical signs of joint disc displacement without reduction. Initially treated only by conservative approaches. Without improvement, arthrocentesis of the TMJ was performed. The symptoms do not regress, leading the patient to bilateral discopexy procedure. We opted for the alloplastic substitution of the temporomandibular joint with prostheses of stock in both joints through an established protocol.
*DISCUSSION:* The main objective of the reconstruction of the temporomandibular joint in cases of joint bone degeneration is the restoration of form and function, considering the reduction of pain as a secondary result. Alloplastic replacement of TMJ can be considered as an alternative therapy to improve the quality of life of a small group of patients showing signs and symptoms of TMD as a reduction of maximum mouth opening, pain, etc.
*CONCLUSION:* The use of total joint prostheses has been configured as a good therapeutic alternative for severe conditions of TMJ that do not respond to conservative treatments. However, further studies are needed to demonstrate whether these results are long term.



## 1. Introduction

Temporomandibular disorders (TMDs) encompass a set of clinical conditions that affect the temporomandibular joint (TMJ), the masticatory muscles and the associated tissues. The most prevalent TMDs symptoms are pain in the TMJ region, in the masticatory muscles, and in the neck and shoulder region. Many therapeutic alternatives can be considered, being divided into non-invasive (pharmacotherapy, physiotherapy), minimally invasive (arthroscopy, arthrocentesis) and invasive (arthroplasty) interventions [1,2].

Initially, conservative therapies aimed at reducing pain and improving joint function should be prioritized. However, patients with severe pain or those who do not respond to non-invasive treatment may be candidates for alloplastic or autogenous reconstruction of TMJ [1].

Total reconstruction of the joint is a therapeutic alternative capable of returning form and function to the joint. The main indications for this type of invasive treatment are: ankylosis, osteoarthritis, autoimmune diseases, tumors, congenital deformities, severe condylar resorption or other TMJ pathologies resistant to conservative treatment [3].

In 1933 surgeries for TMJ reconstruction began to be performed by Risdon through the insertion of gold leaf into the joint fossa. With the development of materials and techniques, alloplastic materials began to be used, demonstrating good results [4,5].

The ideal total alloplastic joint reconstruction is one that supports chewing forces, reproduces the movements of a normal TMJ, and enable speech and swallowing functions without alterations [1]. In addition, the prosthesis should be non-toxic, biocompatible, stable and resistant to corrosion [6]. The main benefits of using the

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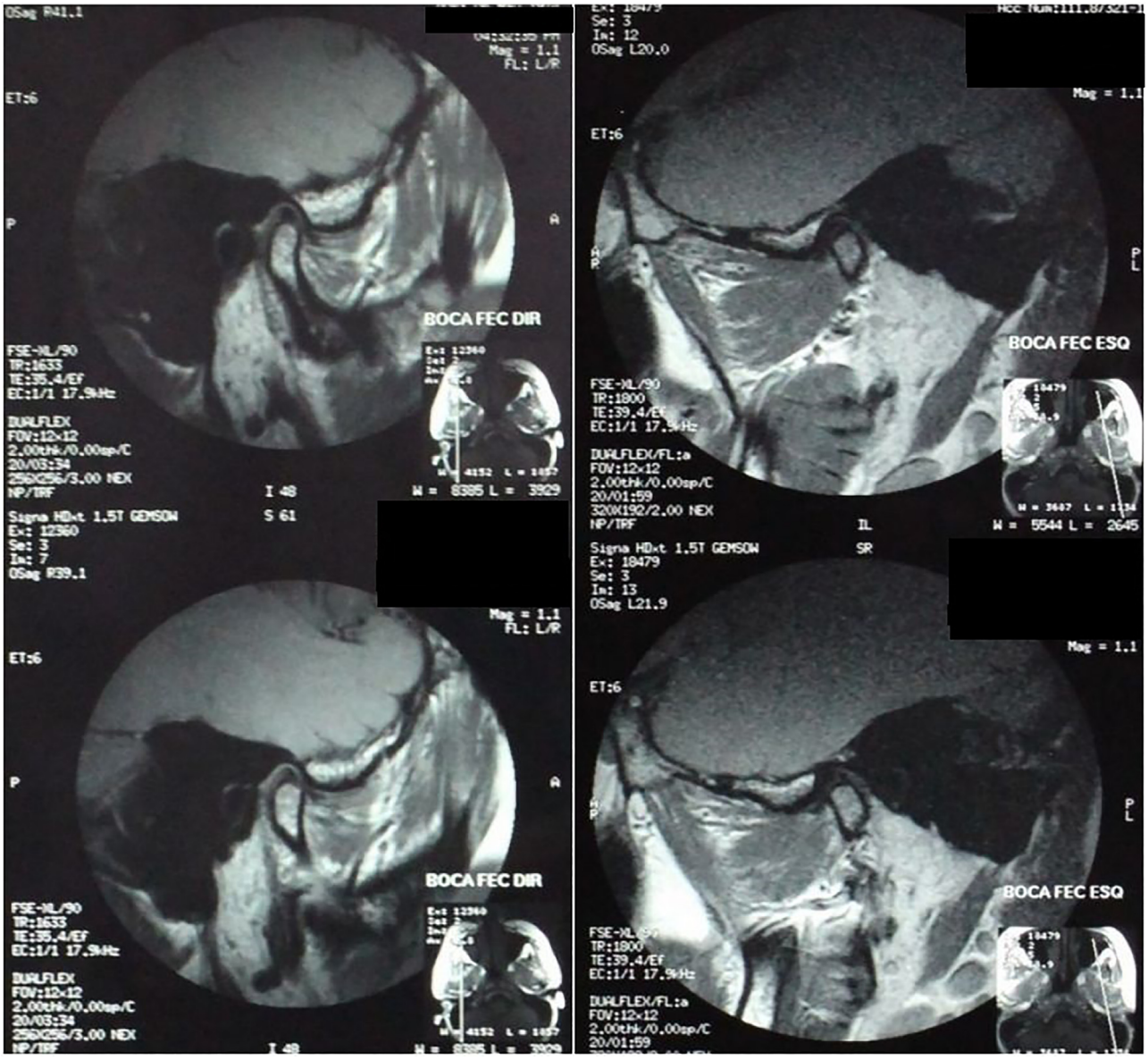


**Fig. 1.** Magnetic Nuclear Resonance of the right and left TMJs in the closed mouth.

alloplastic prostheses compared to an autogenous reconstruction are: the possibility of physical therapy in the immediate postoperative period, the reduction of time and surgical morbidity on account of no need donor site, symmetry and occlusal stability, creating greater predictability of rehabilitation [7].

The total alloplastic prostheses of the TMJ can be of two types: of storage or customized. The stock prosthesis has two components of standard shape and size (small, medium or large). These components are the articular fossa, made of ultra-high molecular weight polyethylene, and the mandibular condyle, made of cobalt-chromium alloy and a layer of titanium. The prostheses of inventory have as advantages the lower cost, the immediate availability, in addition to exempt the bone prototyping [4].

With the advent of computed tomography, customized total joint prostheses, have been carried out, making the most predictable final results. The customized prostheses are indicated mainly for patients with anatomical deformities of the joint coming from the degenerative pathologies or surgeries previously performed [8], as well as by resection of tumors located in the condyle or ankyloses.

The customized prosthesis is made from a prototype obtained through a computerized tomography of the patient. The possibility of managing the loads imposed, reducing the possibility of micromovements is a great advantage of the customized prostheses, as well as the better positioning of the screws in the joint fossa and branch of the jaw, factors that allow greater predictability of results and shorter surgical time [1,4].

This work aims to report a case of inflammatory joint pain and dysfunction treated with bilateral TMJ full reconstruction with alloplastic prosthesis stock. This work has been reported in line with the SCARE criteria [9].

## 2. Case report

Patient D.J.S.S., female, 41 years old, hypertensive, without other systemic diseases, for six years had constant pain in TMJ bilaterally, with limitation of mouth opening, with a clinical signs of joint disc displacement without reduction. The magnetic resonance imaging showed displacement of the articular disc without reduction in open-mouth maneuver (Fig. 1). Initially treated only by

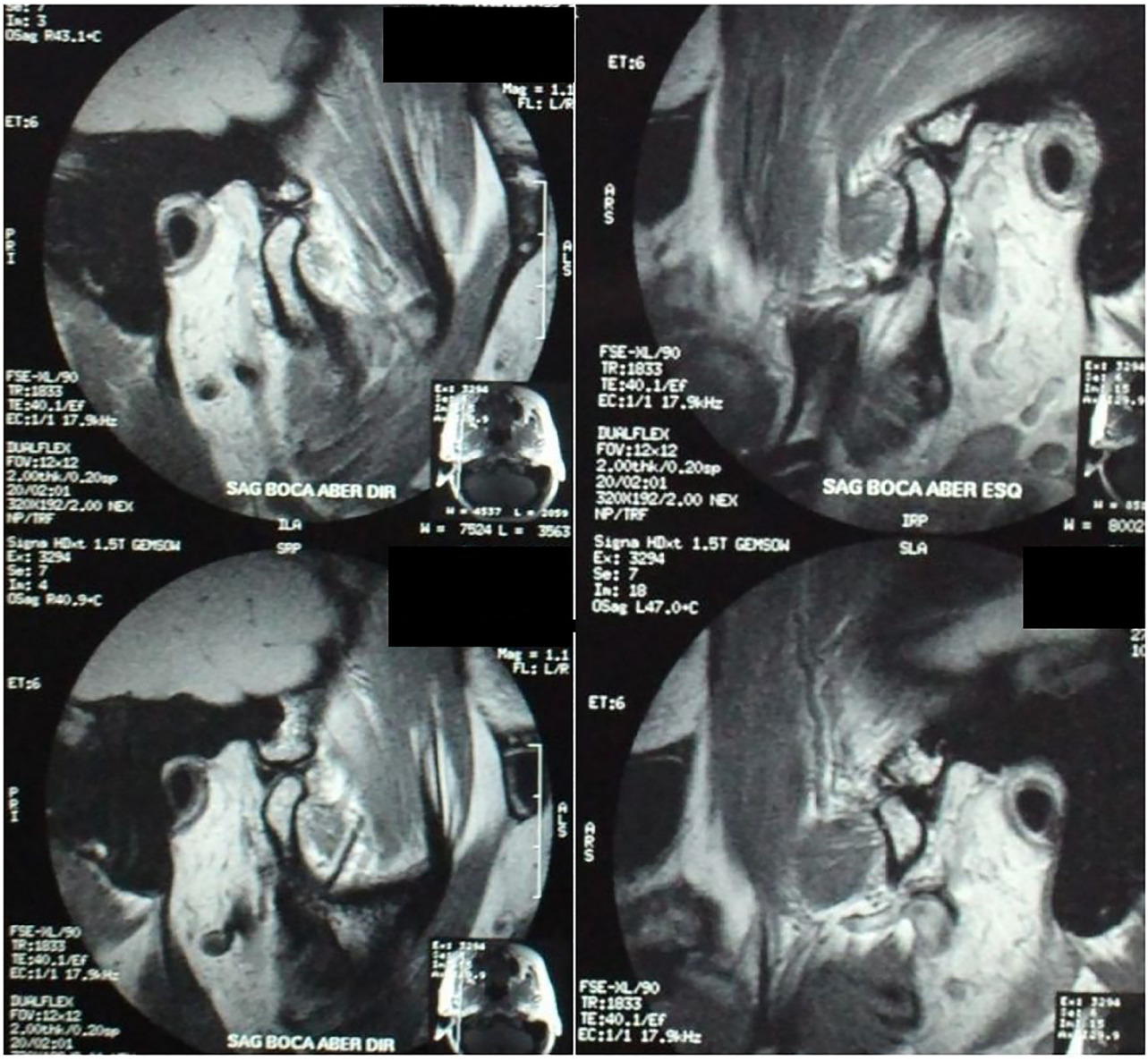


**Fig. 2.** Nuclear Magnetic Resonance of right and left TMJs in open mouth maneuvers.

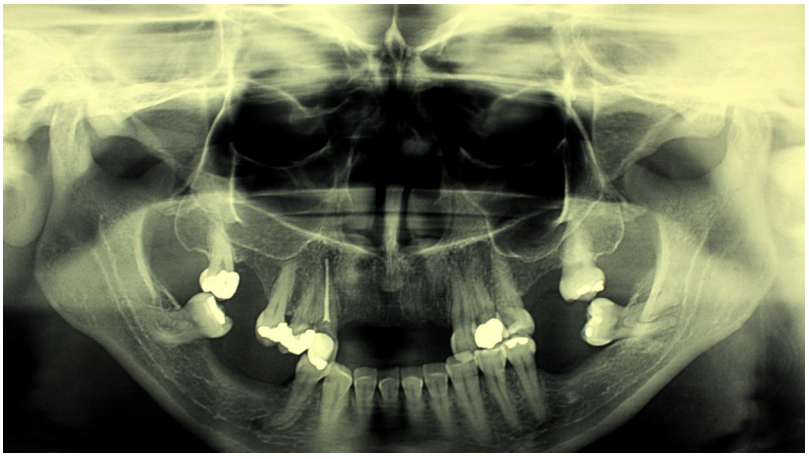

**Fig. 3.** Preoperative panoramic radiography.

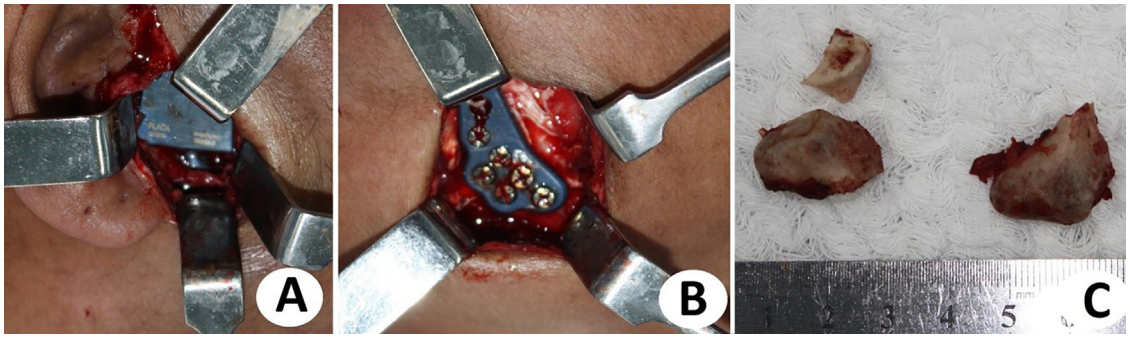


**Fig. 4.** A) Component of the joint fossa installed by pre-auricular access B) Condylar component installed by submandibular access C) Resected condyles.

**Fig. 5.** Medial panoramic radiography showing articular prostheses in position.

**Fig. 6.** Postoperative panoramic radiography of 1 year.

conservative approaches with occlusal rehabilitation, myorelaxant plaque, analgesics and oral muscle relaxants, acupuncture and speech therapy. Without improvement, arthrocentesis of the TMJ was performed 1 year after the onset of symptoms, which persisted, the procedure has been performed 2 years later again. The symptoms do not regress, leading the patient to bilateral discopexy procedure one year later and new approach to joint lavage and removal of the anchors after another one year. Throughout this period, conservative treatments and palliative care were maintained, in addition to the establishment of laser therapy. However, it was observed only worsening of the pain condition with severe limitation of the mouth opening (13 mm measured without using upper dentures) and increasing difficulties in social interaction, chewing and oral hygiene. Noted in imaging, significant faceting condylar bilaterally (Fig. 1). We opted for the condylar resection treatment, with alloplastic substitution of the temporomandibular joint with prostheses of stock in both joints through an established protocol (Figs. 2–6).

**Fig. 7.** Satisfactory mouth opening, no deviations or pain.

The surgical procedure was performed by the preceptor/coordinator of the residency service in Buccomaxillofacial Surgery and Traumatology, UFBA/OSID.

The submandibular and preauricular accesses were performed, the condyles were resected bilaterally approximately 1 cm below the condylar neck. The prostheses were installed with joint components (glenoid fossa) and mandibular, with the maxillomandibular block maintaining the occlusion in position. Constant pain relief was observed in the immediate postoperative period.

One year after of the procedure, the patient develops with total absence of pain in TMJ region, stable occlusion, good mouth opening (39 mm) and mandibular movements of laterality and protrusion, returning to social interaction and exercising the stomatognathic functions normally, completed the post-operative speech therapy, without the use of medications (Figs. 7 and 8), being obtained the expectations of the patient, who sought the remission of pain and return to daily activities.

## 3. Discussion

Some conservative treatments are indicated in cases of TMDs, such as pharmacotherapy, physiotherapy, arthroscopy and arthrocentesis. However, in pathologies resistant to conservative treatment, more invasive options are recommended. Liu and Steinkeler classifies as invasive treatments the arthroplasty and the total reconstruction of TMJ, and states that these treatments should be indicated only in severe degenerations and/or end stages of joint pathology.

Westermark et al. argue that in cases of pathologies in which success with non-invasive treatments is unlikely, TMJs reconstruction should be indicated more early, since the literature has shown that patients who have not undergone to other previous therapeutic alternatives respond better postoperatively. There are few studies that bring pain as justification for prosthetic replacement of TMJ, however, Kanatas et al. [17] observed that alloplastic replacement of TMJ can be considered as an alternative therapy to improve the quality of life of a small group of patients showing signs and symptoms of TMD as a reduction of maximum mouth opening, pain, etc.

In a study conducted by Kanatas et al. [17] 31 patients were evaluated for maximum mouth opening and pain changes before and after total temporomandibular joint replacement. After a 12-month period, pain reduction was observed in all patients with a preoperative score decrease from 7.4 to 1.6 in 12 months. It was also observed an increase in the maximum mouth opening in all patients, corroborating with the results of the presented case.

The main objective of the reconstruction of the temporomandibular joint in cases of joint bone degeneration is the restoration of form and function, considering the reduction of pain as a secondary result. Machon et al., found in their study that four patients evolved with postoperative pain worsening, despite the structural restoration. However, in the case presented in this study, the main objective of the treatment was the resolution of pain, since the morphology of the joint and condyle was not totally compromised, and the patient returned to perform the stomatognathic functions satisfactorily and without painful symptomatology.

Westermark et al. conducted a study in a series of patients with follow-up between 2 and 8 years after TMJ reconstruction, where indications for replacement were: ankylosis, rheumatoid arthritis and condylar resorption. Success was observed in all cases, with elimination of pain.

Currently, the use of customized prostheses has been widely considered by the authors, since they affirm that there is a better distribution of condyle loads to the temporal surface, increasing their longevity. However, stock prostheses are still widely used, as they provide a safe, efficient and cost-effective method[13]. In the case presented, the prosthesis used was the stock prosthesis, due to the fact that there was branch integrity, with no need for jaw advancement, with anatomical viability for its installation, presenting good trans and postoperative conditions, besides the lowest cost.

The use of the total prosthesis of TMJ is contraindicated for young patients still in the stage of bone growth, presence of joint infections, allergy to some component of the prosthesis, or even in patients who have a high expectation of improvement with non-invasive treatment [1,7].

New surgical methods for performing joint replacement have been reported, including surgery with endoscopic care. This technique recommends an intraoral incision, such as those used in orthognathic surgery, to avoid injury to the marginal nerve of the mandible. Belli et al. state that facial nerve injury is the most common postoperative complication in joint reconstruction surgeries. In the case presented, although the preauricular and submandibular accesses were used, facial mimicry was preserved. In a study carried out by Machon et al., a greater postoperative buccal opening was observed in all patients submitted to total alloplastic reconstruction of the TMJ, with a mean of 29.1 mm between them. In the case reported, we observed a maximum oral opening of 39 mm (without the use of the upper denture), with patients normally performing their phonation and chewing functions.

Saaed et al., in a study of 99 patients (49 with costochondral graft and 50 with joint prostheses) demonstrated that there was improvement of symptoms in both groups, however, recurrences of ankyloses in the joint were present only in the group treated with graft autogenous, showing the greater risk of ankylosis when opting for this alternative. Wolford et al. [15] demonstrated that the use of fat grafting is an effective method that prevents ankylosis between the components of the prosthesis, improving mobility and mandibular function, not being used in this case because it is not an ankylosis treatment.

Dimitroulis [16] demonstrated that patients submitted to alloplastic TMJ reconstructions had better pain reduction scores and

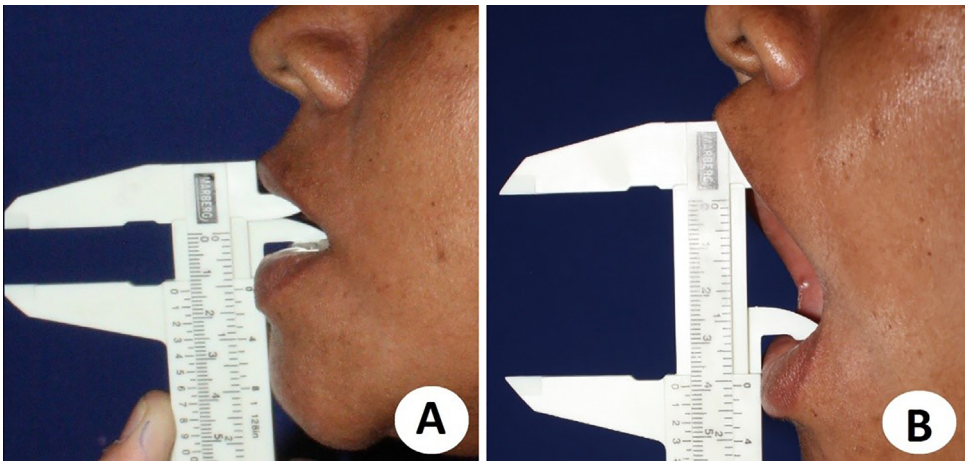


**Fig. 8.** A) Preoperative buccal opening (13 mm) B) Buccal opening after 1 year of surgery (39 mm). Both measurements without the upper denture.

occlusal results when compared to patients submitted to costo-chondral graft reconstruction. Thus, the authors concluded that in patients with teeth the most reliable therapeutic option is the alloplastic replacement of the joint.

Treatment with joint prosthesis has been effective for many patients, however, the indication of total TMJ reconstruction should be carefully analyzed by the surgeon, based on each specific case and the results reported in the long term [3].

## 4. Final considerations

The use of total joint prostheses has been configured as a good therapeutic alternative for severe conditions of TMJ that do not respond to conservative treatments. However, further studies are needed to demonstrate whether these results are long term.

A correct diagnosis of the pathology and the correct indication for reconstruction are of fundamental importance for the success of the technique.

The stock prosthesis is a good alternative when there is no need for mandibular advancement and the branches are still preserved.

## Conflicts of interest

No potential conflict of interest relevant to this article was reported.

## Funding

There was no funding from institutions or people.

## Ethical approval

The present study was approved by the Ethics Committee of the Faculty of Dentistry of the Federal University of Bahia, with opinion number 2.109.553.

## Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

The consent term was obtained, in which the patient allows the use of his images, however, his information, such as name, date of birth, address, are confidential.

## Author contribution

Carlos Vinícius Ayres Moreira: Surgeon who conducted the case, in addition to writing.

André Victor Pinto Serra: Surgeon who conducted the case, in addition to writing.

Larissa Oliveira: Case writing

Ana Carolina Fraga Fernandes: Case writing

Roberto Almeida de Azevedo: Surgeon who conducted the case, in addition to writing and correction.

## Guarantor

Carlos Vinícius Ayres Moreira
André Victor Pinto Serra
Roberto Almeida de Azevedo

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