

Reconstruction and Rehabilitation of Severe Mandibular Atrophy Using Distraction Osteogenesis Technique: A Case Report

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Purpose: The purpose of this article is to describe a rehabilitation technique for patients with severe anterior atrophy using a combination of distraction osteogenesis and implants to support fixed or removable prostheses.

Materials and Methods: The surgical technique involves the use of an extraosseous distraction device followed by more than 14 mm of distraction of the mandibular symphysis.

Results: The patient was successfully treated by the application of 4 implants in the region of the mandibular symphysis, stabilized by an Ackerman bar, and a removable prosthesis.

Conclusion: Osseous distraction techniques, when possible, are preferable to block bone grafting techniques because they present considerable advantages for patients and surgeons. The combination of distraction and implant placement can rehabilitate patients with severe defects.

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Very often, even when not neoplastic, oral cavity masses can cause severe osseous atrophy and can be an important risk factor for mandibular fractures. Osseous mandibular deficits can be treated with osseous replacement materials, such as hydroxyapatite, or osseous transplants harvested from the calvarial bones or from the iliac crest. However, rehabilitation based on autologous bone transplantation has some limitations: the prognosis is uncertain, a harvest site is necessary, and the sequelae can sometimes be complex.¹

Autogenous block bone grafting techniques pertain to maxillofacial surgery and require a general anesthetic and, normally, postsurgical hospitalization.

Alternatively, in some cases, it is possible to re-establish the normal anatomy using an osseous distraction technique. This technique, introduced by Abbot²

and Codivilla³ early in the 20th century, consists of generating new bone by distraction (intramembranous histogenesis). Further studies were performed by Ilizarov⁴⁻⁶ who defined the first scientific protocol for human bone lengthening and highlighted the importance of slow distraction and its impact on bone healing. In fact, he observed that when using an almost continuous distraction system, histogenesis progressed more actively and it was difficult to observe the formation of a new fibrous zone between osseous fragments. However, current clinical instruments do not permit continuous distraction.

In 1973, Snyder et al⁷ reported on the experimental use of osseous distraction in the mandible, but credit also must be attributed to McCarty^{8,9} for the identification of its importance in maxillofacial surgery.¹⁰

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FIGURE 1. Lesion in the region of the mandibular symphysis, which showed an angio-granulomatous inflammatory process with phlogistic and reactive features at histology.

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This method has been used in orthopedics and traumatology to correct congenital deformities, complications derived from incongruous wound healing, and osseous losses from the resection of limb neoplasms.

In contrast to transplantation techniques, which lead to a stiff outcome, osseous distraction makes progressive morphologic correction possible, by which the bone can be modeled in different shapes to rectify skeletal asymmetries or deformities.¹¹⁻¹³ However, osseous distraction requires a plan that considers the distraction vector characteristics that must be taken into account to activate the distraction system. The effects of distraction have to be considered in 3 dimensions to evaluate the post-treatment osseous morphology.¹⁴

The aim of this article is to describe a rehabilitation technique for patients with severe anterior atrophy using a combination of distraction osteogenesis and implants to support fixed or removable prostheses.

Materials and Methods

A 52-year-old woman presented to the authors' clinic with the chief complaint of a lesion in the region of the mandibular symphysis (Fig 1). The patient was a heavy smoker (20 cigarettes per day), had been wearing a removable partial denture for 15 years, and had noticed oral mucosal changes only in the past few months, after the development of pain.

Because the clinical appearance and the history were nonspecific, it was necessary to perform a rapid biopsy examination followed by histology, which showed an angio-granulomatous inflammatory process with reactive features. Therefore, the dental foci were rehabilitated with adequate wide-spectrum antibiotics.

Even with pharmacologic treatment, the lesion exhibited slow remission; therefore, a swab for culture and sensitivity was used to identify the responsible pathogens and to institute specific treatment. Tissue

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