

# Spontaneous extrusion of a Müller sphere 30 years after evisceration

## Extrusão espontânea de esfera de Müller 30 anos após evisceração

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## ABSTRACT

We report a rare case of spontaneous extrusion of a Müller sphere implant three decades after ocular evisceration. A 44-year-old woman, with a history of evisceration of the left eye due to phthisis bulbi from congenital syphilis, presented with extrusion of an orbital implant. Surgical management consisted of reimplantation of a new sphere using a reconstructive technique with scleral shell and biological support. Postoperative recovery was favorable, and progressive prosthetic rehabilitation provided satisfactory functional and cosmetic outcomes. This case illustrates that orbital implant extrusion may occur even decades after surgery and highlights the importance of long-term follow-up in patients with ocular prostheses.

## RESUMO

Relatamos um caso raro de extrusão espontânea de uma esfera de Müller três décadas após evisceração ocular. Mulher de 44 anos, com histórico de evisceração do olho esquerdo por *phthisis bulbi* decorrente de sífilis congênita, apresentou extrusão de um implante orbitário. O tratamento cirúrgico consistiu na reimplantação de uma nova esfera utilizando técnica reconstrutiva com esclera e materiais biológicos de suporte. A recuperação pós-operatória foi favorável, e a reabilitação protética progressiva proporcionou resultados funcionais e estéticos satisfatórios. Este caso ilustra que a extrusão de implantes orbitários pode ocorrer mesmo décadas após a cirurgia e ressalta a importância do acompanhamento oftalmológico de longo prazo em pacientes com próteses oculares.

## INTRODUCTION

Orbital implant extrusion represents one of the most concerning complications in orbital reconstructive surgery, with reported incidence in the literature ranging from 2 to 8%.<sup>(1)</sup> This complication typically manifests in the first years after surgery and is influenced by multiple factors, including implant characteristics, surgical technique employed, local cavity conditions, and host factors. Cases of late extrusion, especially those occurring after one or more decades, are extremely rare in the scientific literature, with most available reports describing complications in the first five postoperative years.<sup>(2)</sup>

The Müller sphere, introduced in 1951, revolutionized anophthalmic socket treatment by utilizing polymethylmethacrylate (PMMA) as a biocompatible material for orbital implantation. This non-porous spherical implant has been widely employed in recent decades, demonstrating excellent biocompatibility and satisfactory long-term aesthetic results.<sup>(3)</sup> However, its non-porous surface prevents true tissue integration, maintaining a mechanical interface that may weaken over time.

This report presents a rare case of spontaneous Müller sphere extrusion occurring 30 years after implantation, one of the longest intervals reported, and emphasizes the need for awareness of ultra-late complications.

This is a retrospective descriptive case report based on clinical data, surgical records, and photographic documentation of a patient treated at a tertiary eye care center in Brazil. Ethical approval was obtained from the Research Ethics Committee of the University of Cuiabá (UNIC), under protocol 7,698,702 (CAAE: 88694125.0.0000.5165), in accordance with Resolution 466/12 and the Declaration of Helsinki. Written informed consent was obtained from the patient.

## CASE REPORT

A 44-year-old female patient presented to the emergency eye care department with a seven-day history of moderate headache, associated with spontaneous extrusion of her left orbital implant upon awakening one day before presentation. She denied recent trauma, infection, or inappropriate manipulation of the ocular prosthesis.

Her medical history included congenital syphilis diagnosed in childhood, which had progressed with bilateral ocular involvement, more severe in the left eye. She developed interstitial keratitis, chronic uveitis, and progressive optic atrophy, culminating in phthisis bulbi at the age of 14. At that time, she underwent evisceration of the left eye with primary implantation of a Müller sphere, according to the standard surgical technique of the period. Records

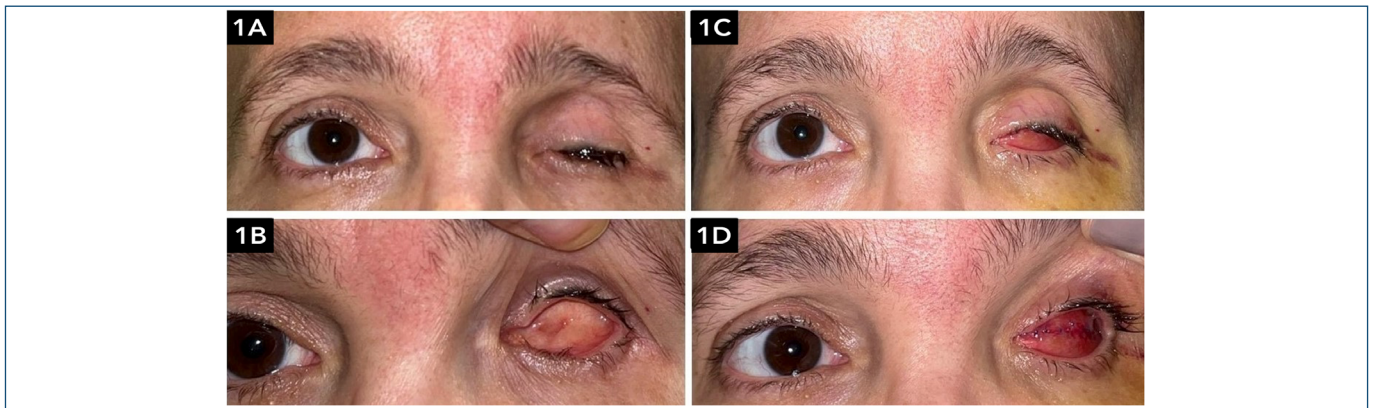
indicated preservation of the posterior sclera with direct placement of the implant into the scleral shell.

The patient maintained regular ophthalmologic follow-up during the first postoperative years, adapting well to a conventional ocular prosthesis. No complications were documented during the first 15 years. Over time, she progressively reduced her consultations, and the last recorded visit had been approximately 15 years prior to presentation. During this interval, she reported progressive loss of prosthetic retention, requiring more frequent replacements, but no episodes of acute inflammation or trauma. Her systemic history was significant only for controlled arterial hypertension.

Ophthalmologic evaluation revealed a normal right eye with best corrected visual acuity of 20/20 and no abnormalities on slit-lamp or fundus examination. The left eye had no light perception. External examination showed mild upper eyelid ptosis and absence of the prosthesis. Ectoscopy demonstrated a central opening of approximately 8 mm in the conjunctiva corresponding to the extrusion site, with clear serous secretion and no acute inflammatory signs (Figures 1A and 1B). The conjunctival fornices were shortened, and orbital volume appeared reduced. Palpation confirmed the absence of any retained implant material. No orbital masses or regional lymphadenopathy were detected.

Following a multidisciplinary discussion involving the oculoplastic surgeon and prosthetist, surgical reconstruction was indicated with the goals of restoring orbital volume, reinforcing the structural support, and preparing the socket for future prosthetic rehabilitation. Under local anesthesia with sedation, careful dissection of scar tissue was performed, preserving remaining extraocular muscles when identifiable. A 16mm-Müller-sphere was selected based on socket volume and implanted into the scleral shell. Donor sclera, previously prepared according to tissue bank protocols, was used to cover the sphere and sutured to the conjunctival remnants with absorbable material. An additional scleral shell was placed as reinforcement, and a temporary conformer was positioned to maintain socket shape. Hemostasis was adequate, and the procedure was completed without complications.

Postoperative recovery was favorable. At one week, the socket appeared healthy with intact, well-apposed conjunctival sutures and no signs of infection or extrusion (Figures 1C and 1D). At three months, the patient was referred for prosthetic adaptation, initiating progressive fornix expansion with gradual conformer adjustments (Figures 2A and 2B). At 6 months, she demonstrated excellent cosmetic and functional results with a stable, well-adapted prosthesis,



**Figure 1.** Left eye ectoscopy. (A, B) Preoperative aspect: orbital cavity with central opening (extrusion point) and signs of atrophic process. (C, D) Seventh postoperative day: orbital cavity with good appearance and well-coaptated conjunctival sutures.



**Figure 2.** Left eye ectoscopy. (A, B) Three months postoperative: fornix dilatation for new prosthesis adaptation. (C, D) Six months postoperative: patient using ocular prosthesis, still undergoing fornix dilatation process.

complete absence of pain, and high satisfaction with the aesthetic outcome (Figures 2C and 2D). The patient reported marked improvement in self-esteem and quality of life, successfully resuming her professional and social activities. She remains under regular follow-up in the oculoplastic service in collaboration with the prosthetist.

## DISCUSSION

This case represents an exceptional contribution to ophthalmic literature by documenting spontaneous Müller sphere extrusion three decades after evisceration. Orbital implant extrusion typically occurs early: up to 78% of cases arise within the first two postoperative years, most between 6 and 18 months, while late events beyond five years account for only 8% of reports.<sup>(4)</sup> Ultra-late cases are extremely rare, with scattered descriptions of alloplastic orbital implant extrusions between 10 and 17 years,<sup>(5)</sup> and one report of silicone extrusion after 30 years in orbital fracture repair.<sup>(6)</sup> Our report therefore establishes one of the longest intervals documented for a PMMA Müller implant, emphasizing the importance of awareness regarding ultra-late complications.

Multiple host- and implant-related factors likely contributed to this rare outcome. Tissue aging progressively alters conjunctival collagen, with reduced type I collagen synthesis, increased metalloproteinase activity, and loss of elasticity, compromising long-term coverage.<sup>(7)</sup> PMMA, unlike porous materials, does not allow true tissue integration, leaving a mechanical interface that may weaken over time.<sup>(8)</sup> Continuous prosthesis movement can generate cumulative microtrauma, analogous to wear in other long-standing prosthetic devices,<sup>(9)</sup> while hormonal changes such as menopause may further impair conjunctival quality.<sup>(10)</sup>

In this patient, congenital syphilis likely added susceptibility. Chronic vasculopathy and microcirculation involvement may reduce repair capacity, while subclinical inflammation can promote collagen degradation, weakening tissue integrity.<sup>(11,12)</sup> Discontinuity of ophthalmologic follow-up for 15 years further aggravated risk, since progressive socket contraction and volume loss may have gone unmonitored.<sup>(13)</sup> Although PMMA implants are biocompatible, they require adequate tissue coverage for stability, and reimplantation success depends largely on socket reconstruction and rehabilitation protocols.<sup>(14)</sup>

The surgical approach in this case incorporated modern strategies, using biological reinforcement to optimize integration. Donor sclera offers excellent biocompatibility and remodeling capacity, providing a collagen scaffold for cellular migration and vascularization.<sup>(15)</sup> Layered reconstruction with implant, sclera, and scleral lens distributes tension more evenly and reduces focal pressure points, improving long-term stability. This method, combined with staged prosthetic rehabilitation –including conformer use, fornix expansion, and customized prosthesis – ensured both functional and cosmetic success.

This case highlights critical preventive and management lessons. Patients with orbital implants should undergo lifelong ophthalmologic follow-up, even in the absence of symptoms, and be educated about warning signs such as prosthetic instability or discharge. Spontaneous Müller sphere extrusion after 30 years underscores that ultra-late complications remain possible. With modern reconstructive techniques and a multidisciplinary approach, reimplantation can achieve excellent results, restoring both socket integrity and patient quality of life.

Spontaneous extrusion of a Müller sphere implant three decades after evisceration represents an extremely rare event in ophthalmology. This case emphasizes that ultra-late complications of PMMA implants may occur even after long periods of clinical stability, reinforcing the need for lifelong ophthalmologic follow-up in patients with orbital prostheses. Surgical reimplantation with biological reinforcement proved to be a safe and effective strategy, providing stable functional and cosmetic rehabilitation when combined with staged prosthetic adaptation and a multidisciplinary approach.

## AUTHORS' CONTRIBUTIONS

Budib CL and Guerra JPQ contributed to the study design, data analysis, writing, and critical review of the manuscript. Milanez AGT contributed to the clinical analysis,

data interpretation, and critical review of the content. Barboza GNC, Barboza MNC, and Moscovici BK contributed to the methodological supervision, discussion of the results, and critical review of the manuscript. All authors approved the final version and are responsible for its accuracy and integrity.

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