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Case Report

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Correction of Muscle Asymmetry caused by Legg-Calvé-Perthes Disease

Tatiana Fagnani Machado*, Honório Sampaio Menezes, Rogério Henrique Miyashiro, Gabriella Andressa Marchesin de Castro

Fagnani Institute

***Corresponding author:** Dra. Tatiana Fagnani Machado, Rua Alm. Pedro Álvares Cabral, 38 – Jardim Cuiaba, Cuiabá - MT, Brasil. E-mail address: marchesin_gabi@hotmail.com

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Abstract

Introduction: Legg-Calvé-Perthes disease is a pediatric orthopedic condition characterized by avascular necrosis of the femoral head. Treatment may vary according to the severity of the disease and may include observation, physiotherapy, orthoses, immobilization and surgery. As a result of surgical procedures and/or immobilization, patients can develop muscle atrophy resulting in asymmetries and an unsightly physical appearance.

Objective: Report on the treatment and correction of asymmetry using polymethyl methacrylate (PMMA) in a patient with muscular atrophy of the right thigh due to Legg-Calvé-Perthes.

Methods: Case report of a patient with muscular atrophy and asymmetry due to Legg-Calvé-Perthes that was treated with 290ml of PMMA implanted in the Vastus Lateralis, Vastus Medialis, and Rectus Femoris muscles as well as subcutaneously in the inner thighs. Treatment was conducted in 3 sessions.

Results: After intramuscular implantation of 290ml of 30% PMMA, the volume increase necessary for aesthetic correction of the right thigh muscles was obtained.

Conclusion: The filler restored the physical appearance of the right thigh, corrected the asymmetry, and restored proportionality to the limbs.

Keywords: Legg-Calvé-Perthes disease, PMMA, polymethyl methacrylate, aesthetics, asymmetry correction, muscular atrophy correction.

Introduction

Legg-Calvé-Perthes Disease was first described in 1910 by Arthur T. Legg, Jacques Calvé and Georg Perthes and has been discussed in medicine ever since [1]. Legg-Calvé-Perthes Disease is an orthopedic condition that occurs in childhood and is characterized by avascular necrosis of the femoral head. This affects children between 5 and 8 years of age and is the result of ischemia of the proximal femoral epiphysis with unknown etiology [1,2]. Treatment may vary according to the degree of the disease, and may include observation, physiotherapy, orthoses, immobilization and, in more serious cases, surgery is indicated to restore hip anatomy and prevent deformities. Several surgical approaches involving procedures on the femur or pelvis are suggested. The objective of surgical treatment is to prevent loss of joint congruity [1,2,3]. As a result of surgical procedures and/or immobilization, patients can develop muscular atrophy, leading to asymmetries in the lower limbs and directly influencing the physical and aesthetic appearance [2,3]. Correcting body asymmetries through fillers is an approach widely used in aesthetic medicine [4,5,6]. Polymethyl methacrylate (PMMA) is a non-absorbable synthetic microsphere polymer well known for its biocompatibility and ability to stimulate collagen production, thus allowing for the growth of connective tissue around the implant [7,8]. For this reason, PMMA has become a widely used filler, and as well because its application is less invasive, recovery is quick, and it offers long-lasting results.

Methods

Retrospective study analyzing a patient treated at the Fagnani Institute who underwent treatment for unsightly sequelae resulting from muscular atrophy and asymmetry as determined in the circumference of the right thigh muscles. This was caused by Legg-Calvé-Perthes and its treatment in childhood. The present study was approved by the research ethics committee of the Centro Universitário de Várzea Grande (UNIVAG) under protocol number 80158524.5.0000.5692.

Case Report

Male patient, 40 years old, sought treatment for unsightly sequelae after surgical treatment of Legg-Calvé-Perthes disease at the age of 11. He was engaging in daily weight training, was free of other illnesses, and had no previous procedure to correct his condition. The patient was 1.66m tall and weighed 72kg. He had no history of allergies and was occasionally taking dietary supplements and vitamin D.

At the age of 11 he was put in a cast for 1 year which led to muscle atrophy and asymmetry as determined in the circumference of the right thigh muscles. Physical examination revealed atrophy of the muscles in the vastus lateralis and vastus medialis regions. In visual analysis, there was a significant difference in volume and shape between the muscles on the right (affected) and left (unaffected) sides, with a difference in circumference of 10cm between the thighs measuring 45cm and 55cm, respectively.

To account for muscle compliance and the volume of PMMA to be used, the procedure was divided into 3 sessions.

In the first session, local anesthetic was used on the muscles to be treated, followed by implantation of the intramuscular filler as shown in Table 1. Twenty days after this procedure, the patient reported discomfort and pain only in the first week. The procedure itself was uneventful for him, and the patient went back to weight training within 15 days.

The patient returned for the second treatment session 99 days after the first. An increase of 2 cm in the circumference of the right thigh (measuring 47 cm) was observed. Local anesthetic was again used on the muscles to be treated and intramuscular filler was implanted as shown in Table 1.

30 days after the second treatment session, the patient reported hardening of the extra-muscular region close to the inferior entry point of the vastus lateralis muscle. This was likely due to a small leak of PMMA into the subcutaneous tissue which stimulated the formation of collagen around the microparticles and gave the patient the sensation of a hardened area. To prevent nodulation here, the patient was given a regimen of 20mg tablets of prednisolone (decreasing doses over 8 days), 10mg tablets of Zyrtec (one per day for 10 days) and 100mg tablets of Allopurinol (one every 12 hours for 10 days). The patient noted no other type of sign or symptom, and on subsequent physical examination there were no signs of inflammation.

156 days after the second treatment session, the patient returned to undergo the third and final session. He noted no pain in the affected region and saw improvement in the area of induration after the prescribed treatment. Examination revealed a total increase of 4cm in right thigh circumference (49cm) which reduced the asymmetry between the two limbs to 6cm. Local anesthetic was administered followed by intramuscular filler implantation. In this session, the material was distributed subcutaneously in the upper portion of the inner thighs to help volumize and stimulate collagen production in this region which is rich in fat and contains little muscle (see Table 1).

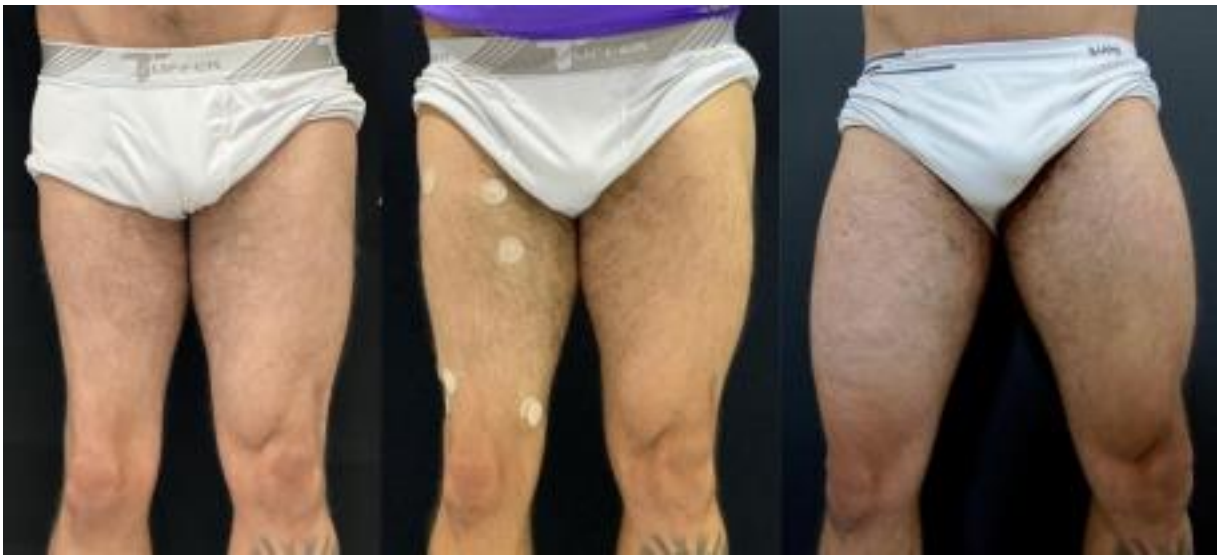

Figure 1: Before, during, and at the end of treatment. Front view.

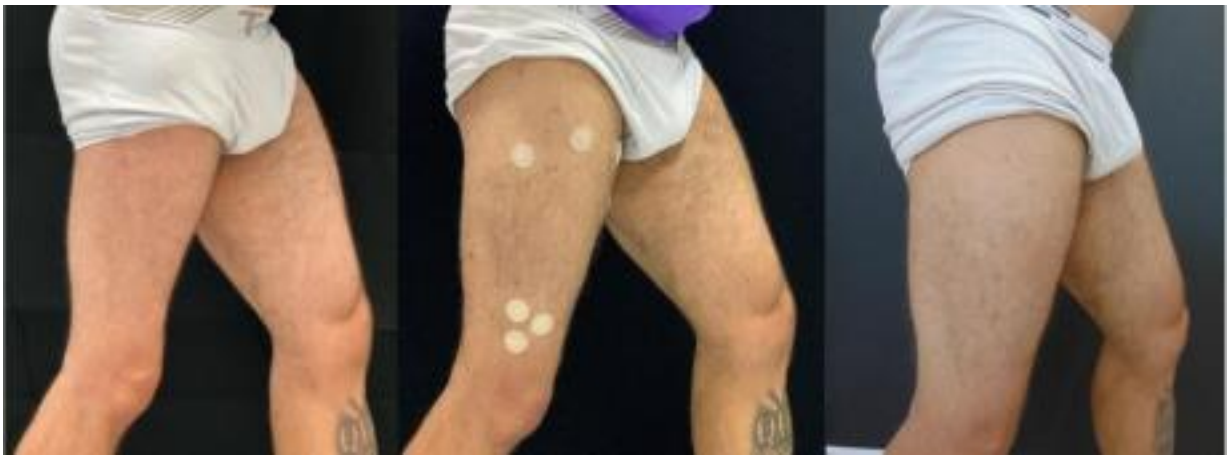

Figure 2: Before, during, and at the end of treatment. Side view.

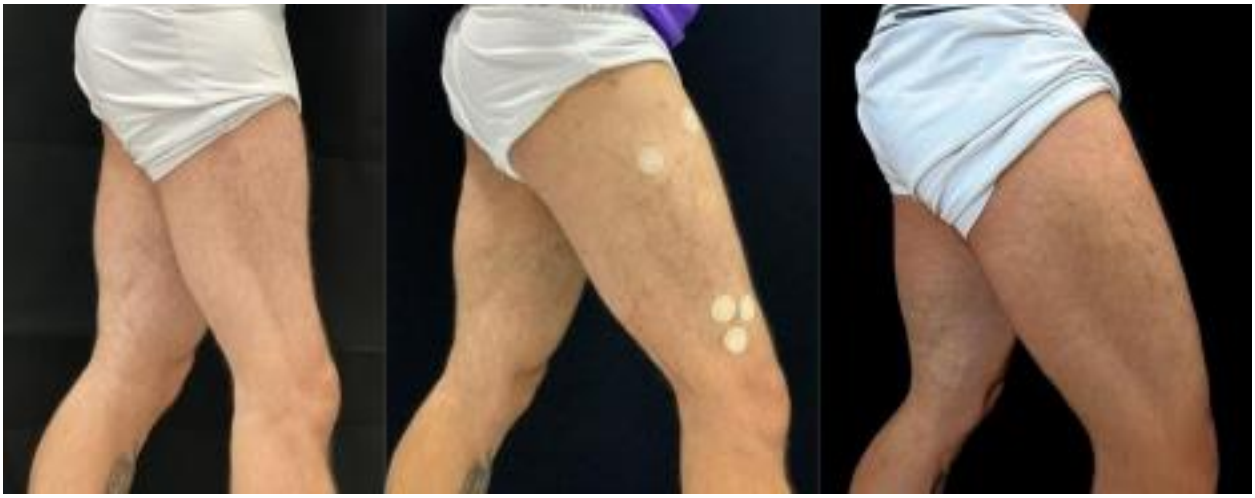

Figure 3: Before, during, and at the end of treatment. Side view.

Table 1: Volumes of 30% PMMA used in the treatment.

Muscle	**Volume**			
	1st session	**2nd session**	**3rd session**	**Total**
Vastus lateral	39ml	36ml	66ml	141ml
Vastus medial	24 ml	36ml	57ml	117ml
rectus femoris	-	12ml	-	12ml
Upper subcutaneous portion of the inner thigh	-	-	20ml	20ml
Total	63ml	84 ml	143ml	**290ml**

40 days after the final procedure, the patient returned for a follow-up exam and reported to be pain-free, had preserved movement, and had returned to normal physical activity. Upon physical examination, there were no complications or any type of sign or symptom.

Two years after the last session, the patient returned for consultation. He reported that he was leading a completely normal life, without pain or any signs or symptoms. He had maintained his bodybuilding practice with an emphasis on the treated quadriceps and noted an increase in muscle strength. The circumference of the left thigh measured 56cm and the right thigh 53cm at this time (Figures 1, 2, 3).

Procedure

The procedure begins with the identification and marking of the muscular limits to be filled. Local anesthesia is then administered with a cannula. The identified areas are then filled with 30% PMMA, intramuscularly, deposited by retroinjection with the aid of a malleable microcannula (18G) using an atraumatic blunt tip to avoid causing vascular or nerve injuries.

Prescription of medicines

The following post-procedure medications were used in all sessions: Diprospan injectable suspension (1ml intramuscularly) and Clexane 40mg (0.4ml subcutaneously) administered in the clinic. For home use, these were prescribed: at night if pain occurs, Esomeprazole magnesium 20mg (1 tablet every 12 hours for 7 days), Tramadol 50mg (1 capsule every 6 hours for severe pain).

Discussion

This report presents the case of a patient with muscular asymmetries secondary to atrophy resulting from treatment for Legg-Calvé-Perthes Disease. In this study, the use of PMMA was shown to be effective in recovering lost muscle volume of the right thigh with significant aesthetic improvement, and without causing any relevant adverse events. This corroborates previous findings on the safety of the material [8-11].

Although absorbable substances such as hyaluronic acid offer advantages in terms of reversibility, PMMA was chosen instead of other fillers because patients with muscular atrophy seek long-term results without the need for frequent touch-ups [5,10-12]

Aesthetic changes can result in feelings of insecurity and social discomfort that impact one's self-confidence and self-esteem. This phenomenon is corroborated by studies that demonstrate how the perception of a deformed physical appearance, such as with Parry-Romberg syndrome, can result in psychological problems including anxiety and depression [13,14].

Given this scenario, therapeutic interventions to restore visually balanced musculature play an essential role in the overall rehabilitation of patients. While PMMA can significantly address this issue, certain considerations must be addressed. For one, standardized application protocols should be established to ensure predictability and safety in treatments. So too, protocols for defining a doctor's clinical experience as well as for recommending this form of treatment. These considerations are especially important as a defining characteristic of this procedure is that subsequent adjustments are difficult.

This was a successful case of using a non-absorbable filler for the aesthetic restoration of muscular atrophy. Future research could deepen the understanding of the long-term biological effects of PMMA and optimize its clinical use. Carrying out the procedure requires a thorough assessment of the patient's individual characteristics to ensure safe, harmonious, and natural-looking results.

Conclusion

Treatment with PMMA was successful in correcting aesthetic asymmetries in a patient with muscular atrophy in the right thigh caused by Legg Calvé-Perthes disease.

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