



# Evaluation of Tension Reduction on Abdominoplasty Scar Using Baroudi Adhesion Sutures

*Avaliação da redução tensional sobre a cicatriz em abdominoplastia com o uso de pontos de adesão de Baroudi*

NÍVEO STEFFEN<sup>1,2</sup>   
THIAGO MELO DE SOUZA<sup>1,2\*</sup>  
CAROLINE BATTISTI<sup>1,2</sup>  
PEDRO BINS ELY<sup>1,2</sup>

## ■ ABSTRACT

**Introduction:** In 1988, Baroudi et al. published a paper describing the use of adhesion points between the dermo adipose flap and the anterior rectus abdominis sheath to reduce seroma formation. This study aimed to demonstrate a probable correlation between the use of Baroudi adhesion points and reduction in flap tension force by measuring the distance from the lower abdominal scar to the xiphoid before and after using Baroudi points in dermolipectomy transoperatory. **Methods:** This was a prospective observational study that selected patients who underwent lipoabdominoplasty at the Santa Casa de Misericórdia Plastic Surgery Service of Porto Alegre from January to April 2019. The transoperatory measurements of distance from the sternal xiphoid appendix to the umbilical scar and from the pre-xiphoid to the post-xiphoid scar before and after execution of Baroudi's adhesion points were compared. Statistical analysis was performed using Excel<sup>®</sup> software. **Results:** A reduction in the distances between the xiphoid-umbilical scar appendix and xiphoid-scar appendix was verified after execution of Baroudi suture (mean 1.5 cm), indicating a decrease in scar tension. **Conclusion:** There was a decrease in the xiphoid-umbilical scar and xiphoid-lower abdominal scar distance after Baroudi stitches, indicating lower scar-tissue tension. Further studies should be conducted to evaluate these measurements in the long term and their correlation with a better-quality scar. **Keywords:** Dermolipectomy; Baroudi Points; Healing tension; Abdominal scar; Abdomen measurements.

Instituição: Santa Casa de Misericórdia de Porto Alegre, Porto Alegre, RS, Brazil.

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<sup>w</sup> Santa Casa de Misericórdia de Porto Alegre, Porto Alegre, RS, Brazil.

<sup>2</sup> Universidade Federal de Ciências da Saúde de Porto Alegre, Porto Alegre, RS, Brazil.

## ■ RESUMO

**Introdução:** Em 1988, Baroudi et al. publicaram um trabalho descrevendo a utilização de pontos de adesão entre o retalho dermo adiposo e a bainha anterior do músculo reto do abdome, no intuito de diminuir a formação de seroma. O presente estudo propõe-se a demonstrar uma provável correlação entre os pontos de adesão de Baroudi com a força tensional do retalho, através da medida da distância da cicatriz abdominal inferior ao xifoide antes e após os pontos de Baroudi, no transoperatório de dermolipectomia.

**Métodos:** Trata-se de um estudo prospectivo observacional. Foram selecionadas submetidas a lipoabdominoplastia no Serviço de Cirurgia Plástica da Santa Casa de Misericórdia de Porto Alegre, no período de janeiro a abril de 2019. Aferiram-se as medidas transoperatórias da distância do apêndice xifoide esternal à cicatriz umbilical, e da primeira à cicatriz cirúrgica, pré e pós-realização dos pontos de adesão de Baroudi. A análise estatística foi realizada com o software Excel®. **Resultados:** Verificou-se a diminuição das distâncias apêndice xifoide-cicatriz umbilical e apêndice xifoide-cicatriz após a realização da sutura de Baroudi (média de 1,5cm), pressupondo-se diminuição da tensão da cicatriz. **Conclusão:** As medidas aferidas no presente estudo mostraram uma diminuição da distância xifoide-cicatriz umbilical e xifoide-cicatriz abdominal inferior após a realização dos pontos de Baroudi, evidenciando uma menor tensão na cicatriz. Sugere-se estudos para avaliar como essas medidas se comportam a longo prazo e se realmente se correlacionam a uma cicatriz de melhor qualidade.

**Descritores:** Dermolipectomia; Pontos de Baroudi; Tensão cicatricial; Cicatriz abdominal; Medidas do abdome.

## INTRODUCTION

Abdominal dermolipectomy, also known as abdominoplasty, has been performed for decades, and it has gradually evolved to the more elaborate techniques currently in use.

From the surgical point of view, there has been a considerable evolution with respect to scar extension and dermo adipose flap detachment.

In the late 1970s, reduced incision abdominoplasty was introduced, which provided good results in selected cases. However, changes in the supraumbilical region could not be properly corrected with this technique, and this limitation with excess skin was evident when the patient sat, leading to patient and doctor dissatisfaction in most cases.

In the 1980s, the introduction of liposuction associated with abdominal plastic surgery yielded better results. However, there were considerable complication rates, especially with seromas<sup>1</sup>.

In 1988, Baroudi et al. published a paper describing the use of adhesion points between the dermo adipose flap and the anterior rectus abdominis sheath to reduce dead space and consequent seroma formation, a frequent complication previously observed due to extensive detachment in the classic abdominoplasty<sup>2</sup>. In 1999, Avelar et al.<sup>3</sup> described the technique of mini-tummy tuck without flap detachment in the lower abdominal portion. In 2001, Saldanha<sup>4</sup> introduced the lipoabdominoplasty technique with preservation of the perforating vessels, showing a significant reduction in flap necrosis rates and introducing a new direction in abdominal plastic surgery. Lipoabdominoplasty with liposuction reduces supraumbilical dermo adipose flap detachment and preserves blood circulation in the flap<sup>3</sup>.

Abdominoplasty is based on the variable length of detachment of the fasciocutaneous layer of the abdomen encompassing the xiphoid-pubic region, flank region, and costal arches, with subsequent resection of the dermo adipose panicle excess and lowering of

the flap. The tension generated by the flap approach towards the lower incision seems to be responsible for scar enlargement, tendency of more cranial scar positioning, suture dehiscence, and necrosis of the lower flap portions<sup>4</sup>.

Since 2005, lipoabdominoplasty has been the preferred technique for treatment of abdominal deformities at the Santa Casa de Misericórdia Plastic Surgery Service of Porto Alegre/Federal University of Health Sciences of Porto Alegre. This consists of performing epigastrium and flank liposuction with reduced dermo adipose flap detachment. During the synthesis, Baroudi adhesion points are made to reducing the dead space and facilitate the flap descent associated with better positioning. The number of points executed does not follow any predetermined rigid standard and are performed as needed<sup>5</sup>.

Although several studies have been conducted on the use of Baroudi points for seroma reduction, limited data are available on the use of Baroudi adhesion points for scar tension reduction and subsequent improvement in its appearance.

Therefore, the present study proposed to demonstrate a probable correlation between Baroudi adhesion points and flap tension force, verifying the positioning, maintenance, and scar quality after abdominoplasty by using these points<sup>6</sup>.

## OBJECTIVE

The main objective of the present study was to quantify the reduction of scar tension after abdominoplasty using Baroudi adhesion points.

Additionally, the transoperatory measurements of the distance from the sternal xiphoid appendix to the umbilical scar before and after the execution of Baroudi adhesion points was compared to correlate these measurements with the healing quality.

## METHODS

### Inclusion criteria

Female non-smoking patients aged 18–60 years and with a body mass index (BMI) of  $<28 \text{ kg/m}^2$  who underwent lipoabdominoplasty at the Santa Casa de Misericórdia Plastic Service of Porto Alegre from January to April 2019 were included.

### Exclusion Criteria

Patients who did not agree to participate in the study were excluded.

## Design

This was a prospective observational study.

## METHODS

All included patients underwent standardized pre-, trans-, and postoperative care.

The transoperatory measurements of distance from the sternal xiphoid appendix to the umbilical scar and from the pre-xiphoid to the post-xiphoid scar before and after execution of Baroudi's adhesion points were measured. The difference between these two measurements was evaluated in the results.

Consecutive prospective statistical analysis of the data was performed using Excel software<sup>®</sup>.

The present study was not interventional. The surgical procedure for abdominal dermolipsectomy was performed in each patient as indicated by the case after the consent form and authorization for surgery were obtained. Lipoabdominoplasty was used as the surgical technique, and the study included patients who met the inclusion criteria. All standards issued by the National Health Agency were strictly followed. Patients and/or guardians received proper guidance on the procedures performed.

The Santa Casa de Misericórdia Plastic Surgery Service of Porto Alegre/Federal University of Health Sciences of Porto Alegre is committed to maintain confidentiality of data contained in the medical records, ensuring that patients are not identified during the course of the research.

## RESULTS

Eighteen patients were included in the study, and their transoperatory measurements are listed in Table 1.

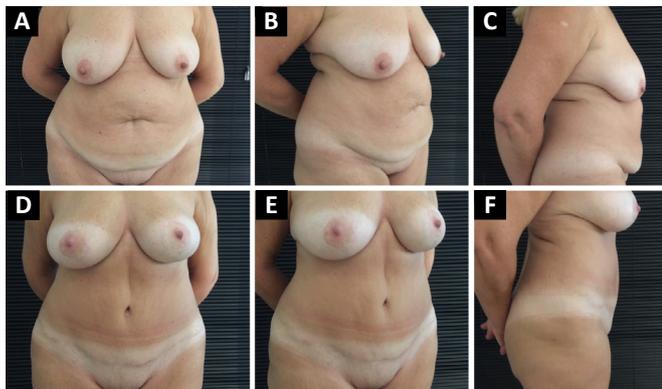
A decreased in the distance of the xiphoid-umbilical scar appendix and the xiphoid-surgical scar appendix (Figures 1, 2 and 3) was observed after the use of Baroudi adhesion points (Figures 4 and 5).

## DISCUSSION

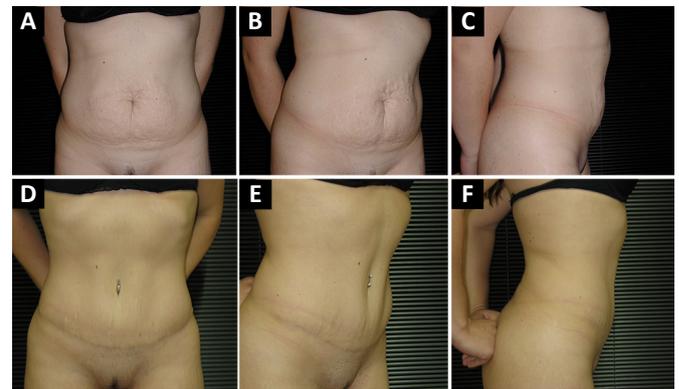
There have been complications associated with the evolution of abdominoplasty, especially for seroma and flap necrosis, which vary according to the case. The main cause of complications is the large displacement in classical surgery that sliced lymphatic and perforating vessels. To minimize such complications, various techniques were proposed to reduce dissections. Baroudi's adhesion points were undoubtedly a simple and efficient solution to a frequent and sometimes complex problem. In abdominoplasty, the adhesion technique initially

**Table 1. Pre- and postoperative measurements of Baroudi adhesion points in centimeters**

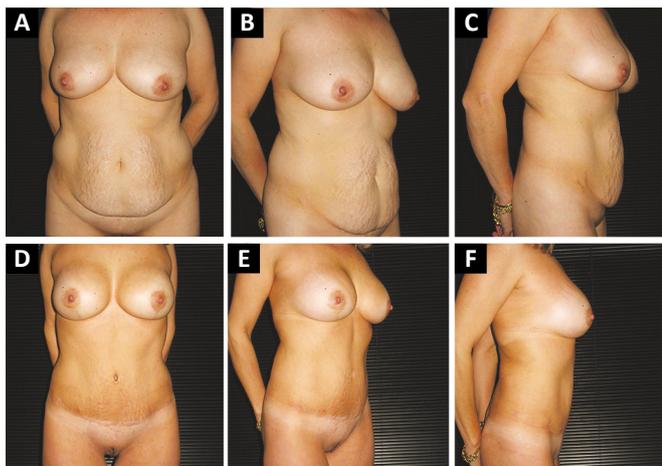
Patient	Pre-Xiphoid Umbilical	Post-Xiphoid Umbilical	Pre-Xiphoid Scar	Post-Xiphoid Scar
1	10.0cm	9.0 cm	20.0 cm	19.0 cm
2	10.4cm	8.9 cm	20.4 cm	18.9 cm
3	11.8 cm	9.8 cm	21.8 cm	19.8 cm
4	10.4 cm	8.4 cm	20.4 cm	18.4 cm
5	12.2 cm	10.7 cm	22.2 cm	20.7 cm
6	10.8 cm	9.8 cm	20.8 cm	19.8 cm
7	12.6 cm	11.6 cm	22.6 cm	21.6 cm
8	11.2 cm	9.7 cm	21.2 cm	19.7 cm
9	13.0 cm	11.0 cm	23.0 cm	21.0 cm
10	11.6 cm	9.6 cm	21.6 cm	19.6 cm
11	13.2 cm	11.7 cm	23.2 cm	21.7 cm
12	11.4 cm	10.4 cm	21.4 cm	20.4 cm
13	12.8 cm	11.8 cm	22.8 cm	21.8 cm
14	11.0 cm	9.5 cm	21.0 cm	19.5 cm
15	12.4 cm	10.4 cm	22.4 cm	20.4 cm
16	10.6 cm	8.6 cm	20.6 cm	18.6 cm
17	12.0 cm	10.5 cm	22.0 cm	20.5 cm
18	10.2 cm	9.2 cm	20.2 cm	19.2 cm
Mean	11.5 cm	10.0 cm	21.5 cm	20.0 cm



**Figure 1. A-C Preoperative; D-F Postoperative 12 months.**



**Figure 3. A-C Preoperative; D-F Postoperative 12 months.**



**Figure 2. A-C Preoperative; D-F Postoperative 12 months.**

described by Baroudi and Ferreira to detached flaps is an effective method to eliminate seroma and use a suction drain<sup>7,8</sup>. Its benefits were reiterated by Nahas et al. in 2007<sup>9</sup>, Pollock et al. in 2000<sup>10</sup>, and Roje et al. in 2006<sup>11</sup>.

Based on our study results, it was possible to refute the null hypothesis that there is no significant difference in distances with and without the use of Baroudi adhesion points.

The reduction in the distance of the xiphoid-umbilical scar appendix and xiphoid-surgical scar appendix was verified after the execution of Baroudi suture (mean 1.5 cm), assuming a reduction in scar tension and a reduction in the surgical scar distance of the xiphoid appendix at the expense of narrowing the distance between it and the umbilical scar.

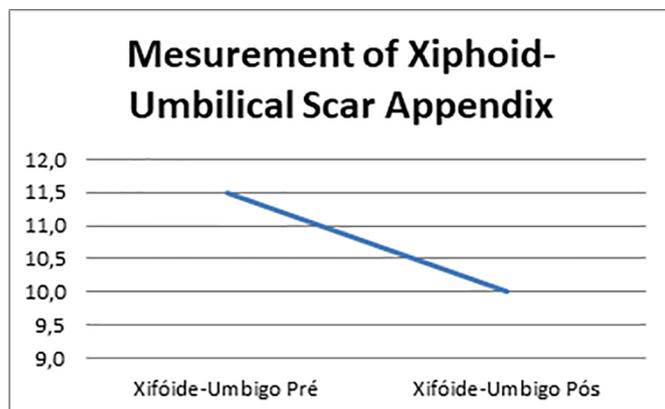


Figure 3. Variation in the measurement of the xiphoid-umbilical scar appendix.

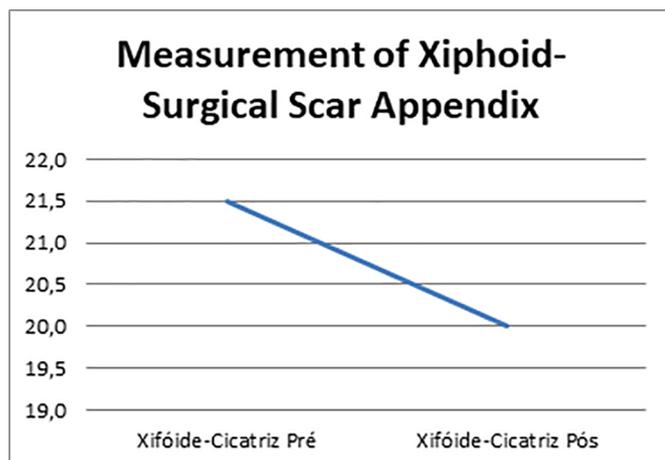


Figure 4. Variation in the measurement of the xiphoid-surgical scar appendix.

Follow-up of these patients is necessary to verify the long-term postoperative scar evolution.

## CONCLUSION

There was a decrease in the xiphoid-umbilical scar and xiphoid-abdominal scar distances after the Baroudi stitches on the abdominal flap, showing a lower tension on the scar after using these adhesion points. Further studies should be conducted to evaluate how these measures behave in the late postoperative period until scar maturation and if they actually correlate with a better-quality scar.

\*Corresponding author:

**Thiago Melo de Souza**

Rua Professor Annes Dias, 135, Centro Histórico, Porto Alegre, RS, Brasil.

Zip Code: 90040-001

E-mail: thiagosouza.md@gmail.com

## COLLABORATIONS

<b>TMS</b>	Statistical analysis, design and study design.
<b>CB</b>	Statistical analysis, design and study design.
<b>NS</b>	Writing of the manuscript or critical revision of its content.
<b>PBE</b>	Writing of the manuscript or critical revision of its content.

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