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Case Report

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Comparison of Bichectomy Techniques Through a Clinical Case and 6-Month Follow-up

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Abstract

Introduction: Bichectomy consists in the partial removal the Bichat ball (BB) of its buccal extension and smoothing the facial contour. The objective of this study is to present, by means of a clinical case, bichectomy surgery with the use of a high-power diode laser and cold scalpel on different sides of the same patient, analyzing the trans-surgical phase and the pain and edema like consequence operative of each technique and 6-month follow-up.

Case Presentation: A 20-year-old female patient reported the occurrence of involuntary trauma to the cheek mucosa and rounded facial appearance. After anamnesis and clinical examination, bichectomy was proposed. For comparison, on the right side, an incision was made using a laser, while on the left side, with a cold scalpel. To assess and measure the progression of treatment, photographs and facial measurements were repeated before the procedure, 7, 14 and 28 days after the procedure, and 2, 3 and 6 months after the procedure.

Conclusion: The high-power diode laser showed excellent applicability for bichectomy due to its hemostatic properties in the trans-surgical phase. In addition, it promoted greater patient comfort, with less edema and pain on the side of the face where it was used.

Keywords: Lasers; Adipose tissue; Oral surgery.

Introduction

The Bichat ball (BB) is an adipose body present on the cheeks, which was first identified by the German Laurentius Heister, who considered it a gland. Only in 1802, Frenchman Marie François Xavier Bichat studied and found that its nature is adipose. This body relates to the chewing muscles, added as a cushion between them.[1-6] The fat cushion is surrounded by a thin fibrous capsule and has a pyramidal shape. BB is innervated by the buccal and zygomatic branches of the facial nerve, internally by the buccal nerve, and it is irrigated by the superficial temporal arteries, the buccal branch of the maxillary artery and the facial artery and vein.[6-11]

In some people, the presence of a large fatty volume may give a rounded face, creating a disharmonious facial contour and causing the impression of overweight. In addition, some patients have morsicatio buccarum, a habit of biting the cheeks causing recurrent lesions that lead to ulcerations and bleeding. Such pathology can bring great discomfort when performing the fundamental activities of the stomatognathic system.[8,10-16]

Bichectomy or BB removal surgery is the surgical procedure performed to circumvent situations of facial disharmony and is an attempt to resolve the morsicatio buccarum.[12-17] The surgery is elective and is indicated for normoreactive patients without serious medical conditions, who desire a more defined facial shape and/or improvement of discomfort regarding recurrent trauma to the inner cheeks.[1,6,8,11,13] The contraindications and risks of this surgical procedure exist and should be considered with caution prior to the procedure. It is also important to analyze the indications for bichectomy and differentiate it from a purely aesthetic, functional or aesthetic-functional objective. Furthermore, it is essential to talk to the patient regarding his expectations, without promising and guaranteeing results incompatible with reality. Finally, measuring the benefits and costs of such an intervention is also important.[8,13,16]

There are numerous ways to perform surgical access to the fat pad. One of them is incising the tissue with a scalpel blade, and another one can be a high-powered laser. The incision in the cheek region can occur slightly below the parotid duct, following the horizontal line of mastication, approximately 1.5 cm long or just below the bottom of the vestibule, the distance of 2 cm, between the first and second molars, also in the horizontal direction. They should be superficial, just enough for a blunt-tipped instrument to detach the buccinator muscle fibers and seize the fat pad.[3,7,10,11,16,18]

LASER is the acronym for light amplification by stimulated emission of radiation, and the one used to perform the bichectomy is the high power or also named

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surgical. The laser, for its monochromaticity, coherence and collimation, has a specific relationship with the tissues, presenting an absorbing chromophore. In the case of the diode surgical laser, its absorption by mineralized tissues is negligible, without the ability to significantly change its surfaces. Thus, it can be used surgically in soft tissues, even close to enamel, dentin and cementum safely.[19] If care with dosimetry is neglected, tissue overheating can occur, resulting in burns and tissue necrosis. [20-23]

Knowing that bichectomy is a bloody procedure, the proposal for a less bleeding surgery is well accepted by professionals. in oral and maxillofacial surgery and traumatology, as well as in other medical areas, the use of lasers and electrosurgery has stood out mainly regarding the control of hemorrhage during the trans-operative phase. This brings on a reduction in surgical time, generating comfort for the patient and the professional. Particularly, lasers also deliver additional benefits due to their secondary photobiomodulation and bactericidal activity.[20-24] Thus, the objective of this study is to present, by means of a clinical case, bichectomy surgery with the use of a surgical diode laser or cold scalpel on different sides of the same patient, analyzing advantages and disadvantages in the trans-surgical phase and the pain and edema like consequence operative of each technique and 6-month follow-up.

Case Report

A 19-year-old female patient presented with an excess volume of the cheeks featuring a round face and recurrent trauma to the jugal mucosa. After anamnesis and clinical examination, bichectomy surgery was proposed in an attempt to improve facial contour and resolve accidental bites. The face was analyzed by means of previous initial photographs and a photo of the initial face (Figures 1A and 1B), and measurements in 3 references were made for comparison with post-surgical edema and final results, being tragus length - wing of the nose (in centimeters) (Figures 1C and 1D), tragus length - labial commissure (in centimeters) (Figures 1E and 1F) and tragus length - mandible angle (in centimeters) (Figures 1G and 1H). The patient returned after 7, 14 and 28 days and 2, 3 and 6 months after the procedure so that new photographs and new measures were taken for comparison and follow-up. And for pain assessment, the visual analogue scale (VAS) as a reference was used.

Initially, amoxicillin 500 mg (2 tablets) and dexamethasone 4 mg (2 tablets) were prescribed 1 hour before surgery with the aim of preventing local infections and obtaining an anti-inflammatory activity acting already in the trans-surgical period. After intra-oral and extra-oral asepsis maneuvers, infiltrative punctures of the anesthetic solution of articaine hydrochloride 4% + epinephrine 1:100 000 were made in the mucous membranes to be incised. Then, with the high-power diode laser (Therapy Surgery, DMC, São Carlos, SP, Brazil) at a wavelength of 980 nm, 4.5-W power, pulsed contact mode, 120-mJ energy, with a 300 µm quartz optical fiber, 10 Hz of repetition, 45 sec, and ≈43 J/cm^2, the incision was made internally to the right cheek, close to the bottom of the groove in a horizontal direction, of approximately 1 cm. It was noted that the edges of the incision took on a cauterized surface aspect and there was no bleeding (Figures 2A and 2B).

To capture the adipose body, Kelly curved and Haslted curved tweezers (Millenium, Golgran, São Caetano do Sul, SP, Brazil) were used to separate the tissues and preserve the fibers of the buccinator muscle as much as possible. Captured and imprisoned by the tweezers, delicate rotational movements were made in the search

Figure 1. (A) Initial face of a 19-year-old female patient. (B) Initial aspect of the smiling patient. (C and D) Reference measure of tragus length: wing of the nose (in centimeters). (E and F) Reference measure of tragus length: tragus length - labial commissure (in centimeters). (G and H) Reference measure of tragus length: tragus length - mandible angle (in centimeters).

of the excision of a portion of the buccal extension of the BB without breaking its fibrous capsule, avoiding greater difficulties for the equitable removal of fatty volume.[1,3,5,6,17,18] (Figure 2C). When feeling resistance to traction, it was decided to separate the remaining adipose link, thus removing 1.5 mL/2.1 g of fat on the right side (Figures 2D and 2H).

Then, on the left side, an incision was made with a cold scalpel at the same location, length and depth, and notable bleeding could be observed, which intensified as the divulsion movements to capture the BB were performed (Figures 2E and 2F). After its capture and imprisonment, delicate rotational movements were repeated to pull it until resistance was felt and finally the BB was removed. Thus, 11.5 mL/2.1 g was also removed from the left side (Figure 2G and 2H).

At the time of surgery, there was complete care in making the incisions of the same size, and deep enough to expose the buccinator fibers, preventing the manipulation of tissues from causing greater trauma, potentiating the inflammatory response. After checking the volume and weight of the fat removed on both sides, the tissues were synthesized with simple sutures and 5.0 Nylon thread (2 points in each incision) (Figures 3A and 3B).

The patient was instructed about postoperative care and continued antimicrobial medication for 5 days,

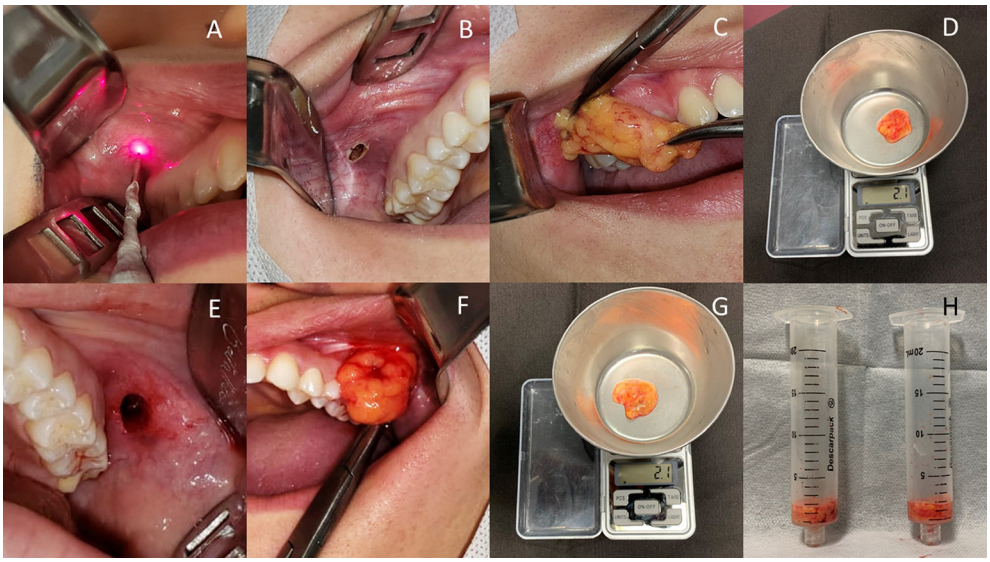

Figure 2. (A) Position of high-power laser for incision. (B) Incision with LASER (right side). To observed that the edges of the incision took on a cauterized surface aspect and there was no bleeding. (C) Bichat Ball without breaking its fibrous capsule, avoiding greater difficulties for the equitable removal of fatty volume (right side). (D) Weighing the Bichat Ball (right side). (E) Conventional scalpel incision (left side). Notable bleeding could be observed. (F) Removed Bichat Ball (left side). (G) Weighing the Bichat Ball (left side). (H) The same amount of adipose tissue was removed on both sides.

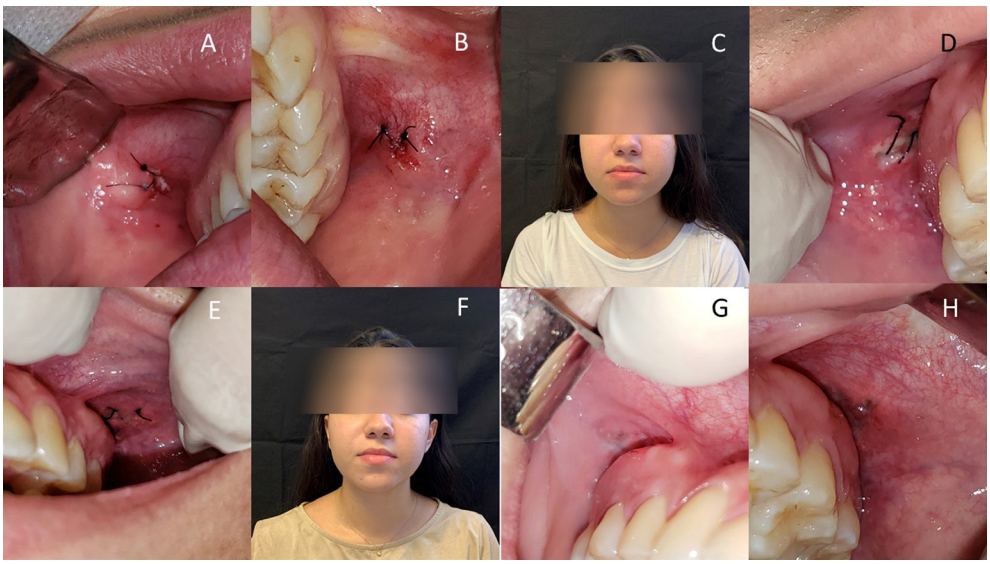

Figure 3. (A and B) Simple sutures were made. (C) Appearance of the patient 7 days after surgery. Note the edema on the left side. (D) Intraoral aspect on the right side after 7 days (LASER). (E) Intraoral aspect on the left side (conventional) after 7 days. (F) Appearance of the patient 14 days after surgery. Note the extra-oral edema decreased, but there was still a slight difference between the right and left sides. G and H - Intraoral aspect on the left and right sides after 14 days, respectively.

taking 1 tablet every 8 hours. The anti-inflammatory drug was maintained for only 1 day, and 1 tablet was prescribed for ingestion in the morning after breakfast. Paracetamol 500 mg was prescribed for use in the first 24 hours, with 1 tablet every 6 hours. The prescription of the antibiotic and anti-inflammatory was strictly followed, but only 1 pill of the painkiller was ingested because, according to her, the peak of pain was about 6 hours after the end of the surgery; thereafter, she did not feel the need to use it. At the peak of pain, a value of 7 was assigned to both operated sides on the VAS ranging from 0 to 10 (0 - no pain and 10 - exacerbated pain). After 5 days, it was reported that the right side had a pain value of 4, while the left side had a pain value of 5.

On the 7th postoperative day, new photographs and reference measurements were taken, and it was noted that the left side, made with a cold scalpel, presented slightly greater edema (Tables 1 and 2, Figure 3C). In the intraoral aspect, the right side was less hyperemic and more advanced in the tissue repair process (Figures 3D and 3E). As for pain, the patient claimed that she only felt it when opening her mouth or smiling, assigning a value of 2 to the right side and 3 to the left side.

Table 1. Measurements of Anatomical Points to Assess Extra-oral Edema on the Right Side

Time	Points		
	Tragus - Wing of the Nose	Tragus - Labial Commissure	Tragus - Lower Edge of the Mandible Angle
Pre-surgical	11.5 cm	10.5 cm	4.5 cm
7 days	11.9 cm	10.8 cm	4.5 cm
14 days	11.3 cm	10.8 cm	4.5 cm
28 days	11.2 cm	10.5 cm	4.5 cm
2 months	11.1 cm	10.3 cm	4.5 cm
3 months	11.0 cm	10.2 cm	4.5 cm

Table 2. Measurements of Anatomical Points to Assess Extra-oral Edema on the Left Side

Time	Points		
	Tragus - Wing of the Nose	Tragus - Labial Commissure	Tragus - Lower Edge of the Mandible Angle
Pre-surgical	10.9 cm	10.6 cm	4.5 cm
7 days	11.5 cm	11.0 cm	4.8 cm
14 days	11.0 cm	10.8 cm	4.5 cm
28 days	10.8 cm	10.7 cm	4.5 cm
2 months	10.6 cm	10.3 cm	4.5 cm
3 months	10.6 cm	10.0 cm	4.5 cm

After 14 days, the extra-oral edema decreased, but there was still a slight difference between the right and left sides, with the latter showing greater measures (Tables 1 and 2, Figure 3F). In the intraoral examination, the LASER incision was visibly in a more accelerated healing process, while the one made with the cold scalpel still had hyperemia and sensitivity to touch and movement (Figures 3G and 3H).

On the 28th postoperative day, the measures that guided the evaluation of the edema regressed and were very close to the initial preoperative measures, showing that the cavity left after BB removal was closing internally (Tables 1 and 2, Figure 4A). The patient reported no painful symptoms or restrictions during movement. Two months after surgery, the patient claimed that she felt a significant difference in facial contour, being satisfied with the results and that until the time elapsed, there was no episode of trauma to the mucous membranes caused by bites (Tables 1 and 2) (Figure 4B). On the 3rd and 6th post-surgical months, facial measurements and photographs showed satisfactory results in terms of facial contour (Tables 1 and 2), measurements on both sides were very approximate, with a slight decrease in the tragus-commissure measurements, and the face gained further harmony (Figures 4C and 4D). The patient also reported the absence of accidental bites.

Discussion

The present study aimed to show the effects of the use of a high-power diode laser in bichectomy and its effects in during and postoperative. Deeper analyses of its use and results in this procedure have not been clearly described in the literature, and there is a gap to be filled. Through this study, it was possible to notice its advantages, mainly in the trans-surgical and immediate postoperative phase. Its thermocoagulant effect provided a clean and comfortable field for the operator, resulting in less surgical time, and it was also more comfortable for the patient. Its antimicrobial properties and photobiomodulation

Figure 4. (A) Appearance of the patient 28 days after surgery. (B) Appearance of the patient 2-month after surgery. (C) Appearance of the patient 3-month after surgery. (D) Appearance of the patient 6-month after surgery.

effect allowed the tissue to obtain a better inflammatory and healing response. The procedure of bichectomy is related to the concept of an "inverted triangle of youth" that may increase the beauty. This concept is defined by an angular facial appearance resulted from a leaner face with a high malar region.[14] In addition, the exeresis of BB also seeks to resolve accidental bites that traumatize the cheek mucosa, as the internal volume of the cheek decreases and consequently the chance of possible trauma becomes less.[1,3,9,12-17] Surgery is elective and is indicated for normoreactive patients without serious medical conditions.[1,5,7,10,16]

Conventionally, the cold scalpel is used, incising the mucosa to locate the fat pad. Due to the characteristics of this tissue, which is extremely vascularized, the incision produces notable bleeding, and simultaneous aspiration of the BB incision, divulsion and exeresis is essential. To access the region, mouth retractors are required. With the exchange of instruments, removal of tissues and aspiration, more surgical time is consumed, with a few more minutes of mouth opening for the patient. On the other hand, it remains a more accessible technique for professionals and patients due to the low cost of the materials used.[1-4,17,18]

Another method that has been gaining ground, especially among the community of dental surgeons, is laser bichectomy. The equipment used is high power, as it has a photothermal interaction. That is, the chromophores present in the irradiated tissue absorb the light, which in turn is converted into thermal energy. The increase in temperature promotes changes in the tissue, generating superficial carbonization and vaporization. In the case of the diode laser, whose chromophores are hemoglobin and melanin, this process causes an instantaneous cauterizing of the blood vessels, and for this reason, there is no bleeding.[19-22,24]

The use of this equipment is advantageous due to its hemostatic properties and its secondary effect of photobiomodulation, which directly contributes to the improvement of pain and stimulates a faster recovery of tissue.[19-21] Even with countless advantages for professionals and patients, the laser is still considered expensive and less accessible equipment, especially for beginning professionals who do not have a fixed clientele; however, the tendency is that its cost will decrease with its popularization.[19]

In this study, it was noticed that the laser can be used safely for procedures in oral surgeries in the same way as the conventional scalpel and with a beneficial increase in the operative phase and in the initial recovery of the patient. Its thermocoagulant properties guarantee good visualization without the complication of several aspirations, speeding up the procedure. Its antimicrobial action allows avoiding pharmacological prescriptions for several days, bypassing its side effects, even if minimal. It is worth mentioning its secondary benefits in the postoperative period.

It was noted through facial measurements and photographs that the photobiomodulation properties improved the inflammatory response, contributing to less edema and hyperemia, and there was less pain in relation to the opposite side and faster healing, as stated before.[19-21,24] While on the left side, made with a scalpel, there was greater edema and pain, as well as slower healing.

In the same patient, both techniques were performed so that it was possible to minimize the variables and obtain a safer result. Its most positive results stood out in the trans-surgical and immediate postoperative period. From the 14 postoperative days onwards, there was no visible difference between the sides. Ideally, randomized clinical trials should be designed so that more accurate conclusions can be drawn.

Conclusion

It could be concluded that the use of a surgical diode laser for incision in the cheek mucosa is safe and provides better visualization of the operative field, due to its hemostatic properties. Further, it contributes to the modulation of the inflammatory response, accelerating the tissue repair process, and it also decreases the possible pain, favoring the decrease in the use of analgesics and anti-inflammatory drugs.

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Conflict of Interests

None of the authors have any conflict of interest to be disclosed.

Ethical Considerations

Informed consent was obtained from the patient for the publication of this report.

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