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A Novel Technique For Surgical Management Of A Rare Case Of Keloid

Case Report

Dr.Rezin Ahmed[1], Dr.Pradeep D[2*], Dr.M.R.Muthusekhar [3]

[1] Saveetha Dental College & Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University,Chennai 600077,Tamilnadu, India.
[2] Associate professor, Department of oral and maxillofacial surgery, Saveetha Dental college & Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai 600077, Tamilnadu, India.
[3] Professor and Head, Department of oral and maxillofacial surgery, Saveetha Dental college & Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai 600077, Tamilnadu, India.

Introduction

Z-plasty is a very common interposition surgical technique utilized in plastic and reconstructive surgery to revise scars. Previously referred to as "converging triangular flaps," Z-plasty involves 2 equal and opposing transposition flaps that are raised and transposed along shared access. A benefit of this procedure over other scar revision techniques is it does not require skin excision for the procedure. The technique is used to change the direction of the scar, so it is more easily hidden within a border of facial regions or relaxed skin tension lines (RSTL). The most frequent variants of the basic Z-plasty are planimetric Z-plasty, double-opposing Z-plasty, compound Z-plasty, unequal triangle Z-plasty, and four-flap Z-plasty. Unequal triangles, also known as the "half-Z," can be subtly altered into an S-plasty to create flap tips that are less susceptible to vascular compromise. S-plasty is useful in areas with an altered dermis, frequently encountered in burns and skin grafts.(Arima et al., 2019; Ogawa, 2019)(Thomas Indresano, 2006). Z-plasty is a very useful plastic surgery technique for closure of wounds without tension. It is usually performed by plastic and cosmetic surgeons. The plastic surgery nurse is usually involved in the monitoring of these patients to ensure that healing is taking place. When closed without tension, Z-plasty has both functional and aesthetic benefit.With a rich case bank established over 3 decades we have been able to publish extensively in our domain (Abdul Wahab et al., 2017; Eapen, Baig and Avinash, 2017; Patil et al., 2017; Jain and Nazar, 2018; J et al., 2018; Marimuthu et al., 2018; Wahab et al., 2018; Abhinav et al., 2019; Ramadorai, Ravi and Narayanan, 2019; Senthil Kumar et al., 2019; Sweta, Abhinav and Ramesh, 2019).

Case Report

A 26 year old male patient reported to the department of Oral and Maxillofacial surgery with the complaint of facial scar that persisted following a road traffic accident 6 months back.On examination multiple Keloids were noted over the chin region .A scar was running from the lower lip towards the chin and neck on the left side of the face.A scar revision was planned for the 2 most prominent scars as those were the scars which the patient was more concerned with.Patient was prepared for the surgery . Under general anesthesia standard surgical scrubbing and draping was done.Markings for the scar was done (figure).As the scar was long scar multiple Z plasty had to be done.Multiple equal and opposing transposition flaps were raised and transposed along shared access.Flpas were sutured with 6-0 proline .

Discussion

The history of the Z-plasty dates back to the early 1800s in a publication at the Philadelphia Hospital Department of Surgery noted by Horner that described single transposition flaps. The geometry of what clinicians know as the Z-plasty was not the same as it is today. At the turn of the century, the "Z-plasty method" became more popular. A publication by Berger in 1904 noted equal limbs and equal angles. In 1914, Morestin proposed multiple Z-plasties. However, it was Limberg, in 1929, who delved into the dynamics of the flap being a rotational and advancement flap. In 1973, Borges provided a review of the developmental history of the Z-plasty.(Kordahi et al., 2018)(Varadharajan, Choudhury and Saleh, 2019).

The indication for a Z-plasty is the lengthening of a contracted linear scar through a flexor crease and changing the direction of a scar to improve cosmetic appearance.(Zhang et al., 2019)(Ahmed and Loh, 2018).

- Treatment of scars that distort facial landmarks.

***Corresponding Author**:
Dr.Pradeep D,
Associate professor, Department of oral and maxillofacial surgery, Saveetha Dental college & Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai 600077,Tamilnadu, India.
Tel : +91 9789936383
E-mail: pradeep@saveetha.com

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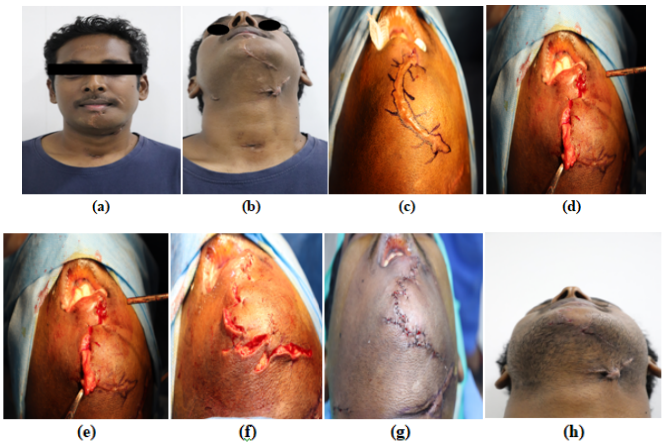
Image a,b,c,d,e,f,g,h:
(a)&(b) shows the preoperative images the scars can be appreciated in the image well.(c)Markings for the Z plasty.(d)(e)(f) Intraoperative images multiple Z plasty is done.(g)Closure with 6-0 poline(h) Image shows the 7 th post operative day



- Contracted/webbed scars.
- McGregor Flap (to close the secondary defect in the preauricular area in order to decrease the risk of ectropion).

There are no absolute contraindications to the Z-plasty technique. Relative contraindications to Z-plasty include patients with keloids and hypertrophic scars. Other relative contraindications include any factor that may adversely affect wound healing such as poor vascular supply, diseases causing poor vascular supply, uncontrolled diabetes, prior radiation of the tissue, the presence of an active infection, and an uncooperative patient.

A discussion must take place with the patient prior to the start of the procedure. During this discussion, risks and benefits of the procedure should be discussed at length. Postoperative care and follow-up should also be discussed. This is an opportunity for the patient to ask questions to assure understanding. Informed consent must be obtained before starting the procedure. The surgical site is prepped utilizing a sterile antibacterial solution, usually povidone-iodine. Sterile drapes are applied to the area.

Technique

On a scar that is perpendicular to the lines of least skin tension, a thickened scar may develop due to tension. In an attempt to change the direction of the scar, a basic Z-plasty technique is employed utilizing 60-degree angles. A Z-plasty consists of a central limb. The central limb contains the scar that is to be lengthened or realigned. Each limb is the same length and results in each segment of the Z contract in different directions. A 60-degree angle will result in 75% increase in length and a 90-degree reorientation of tension. Angles of the Z-plasty result in different changes in length and tension orientation. In general, the greater the angle, the greater gain in wound length. A smaller angle has a risk of flap tip necrosis. A broader angle can result in more difficult flap rotation.

In designing the Z-plasty, one must consider the angle of the design. The greater these angles are, the more lengthening will occur; however, the flaps become harder to transpose over one another.

Angles compared to gain in length are as follows

- 30-degree angle results in 25% gain in length.
- 45-degree angle results in 50% gain in length.
- 60-degree angle results in 75% gain in length.
- 75-degree angle results in 100% gain in length.
- 90-degree angle results in 125% gain in length.

After the area has been prepared with sterile solution, the "2 arms" of the z-plasty are drawn at both ends of the scar. It is important to design the Z-plasty prior to injection of the local anesthetic as this will distort the tissue. These should be drawn with angles at 60 degrees to the linear scar, resembling the letter Z. The arms should be equal in length with the same angle measure. Next, the area should be anesthetized with a 1% lidocaine in a 1:100,000 units of epinephrine. Using a No. 15 scalpel, incisions are made into the skin through the marked areas. The area is then undermined at the subcutaneous fat level. Two equally-sized flaps should be created and undermined at the level of the subcutaneous fat to create full-thickness flaps. After which, the 2 equal flaps are transposed around each other. This results in a directional change of the original scar. The flaps are then held in place with anchoring sutures. The skin is then closed using interrupted sutures. Topical antibiotics or a nonantibacterial ointment is applied with pressure.

Before performing Z-plasty, the skin should be examined for laxity, and some type of planning must be made as to where the incision will be performed. The main disadvantage of Z-plasty is an increased scar length. In addition, the procedure requires 2 additional incisions. Sometimes, the edge of the incision may become depressed or even necrotic when the angle of rotation is acute.

Z-plasty is a very common interposition surgical technique utilized in plastic and reconstructive surgery to revise scars. The technique can also be used to prevent contracture of linear scars, decrease scar length, reposition malpositioned tissues, closing cutaneous defects, and correcting stenosis. Z-plasty is a technique, which is useful when there is scar crossing relaxing skin tension lines. While a single Z-plasty may be utilized for a scar, a serial/compound Z-plasty may be used to address larger scars. Understanding the technique of a basic Z-plasty allows the surgeon to

realize the potential and versatility.

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