Case report

Surgical Correction of Webbed Neck using Modified Z-Plasty Technique: A Case Report

Abstract: Webbed neck, also known as pterygium colli, is a rare anomaly with limited documentation in the medical literature. Often associated with Turner syndrome, this condition presents challenges in complete correction due to its severity. In this article, we present a surgical correction approach for a severe case of webbed neck in a 19-year-old individual. The procedure involved a modified Z-plasty technique, resulting in a satisfactory outcome. Our technique addresses both the webbed appearance and low hairline, significantly improving the patient's neck contour.
Keywords: webbed neck, Turner syndrome, surgical technique, pterygium colli

I- Introduction:

Webbed neck, or pterygium colli, is an infrequently reported anomaly in medical literature. The term was first introduced by Kobylinski in 1883[1] and later coined as pterygium colli by Funke in 1902[2]. The association of pterygium colli with clinical syndromes, such as Ulrrich-Turner syndrome, was established by Turner in 1938[3]. While similar neck webbing occurs in syndromes like Escobar's and Klippel–Feil, the exact etiology and development of pterygium colli remain debated. Although initially considered muscular, fibrotic bands in the fascia colli superficialis have been identified[4]. Our case report describes the surgical correction of severe webbed neck in a 19-year-old individual using a modified Z-plasty technique.

II- Case Study:

Our patient, a 19-year-old male, presented with congenital severe webbed neck and protruding ears. The webbing restricted neck rotation and clothing choices isolated without pectus excavatum, nipple divergence, or other anomalies.

The karyotype could not be performed due to unavailability at the hospital and the patient's lack of means. The neck malformation was characterized by a thick fibrous band limiting rotational head movements and, consequently, the ability to wear certain clothing. Surgical correction aimed to address the webbed appearance and low-hairline concern (Figure 1).

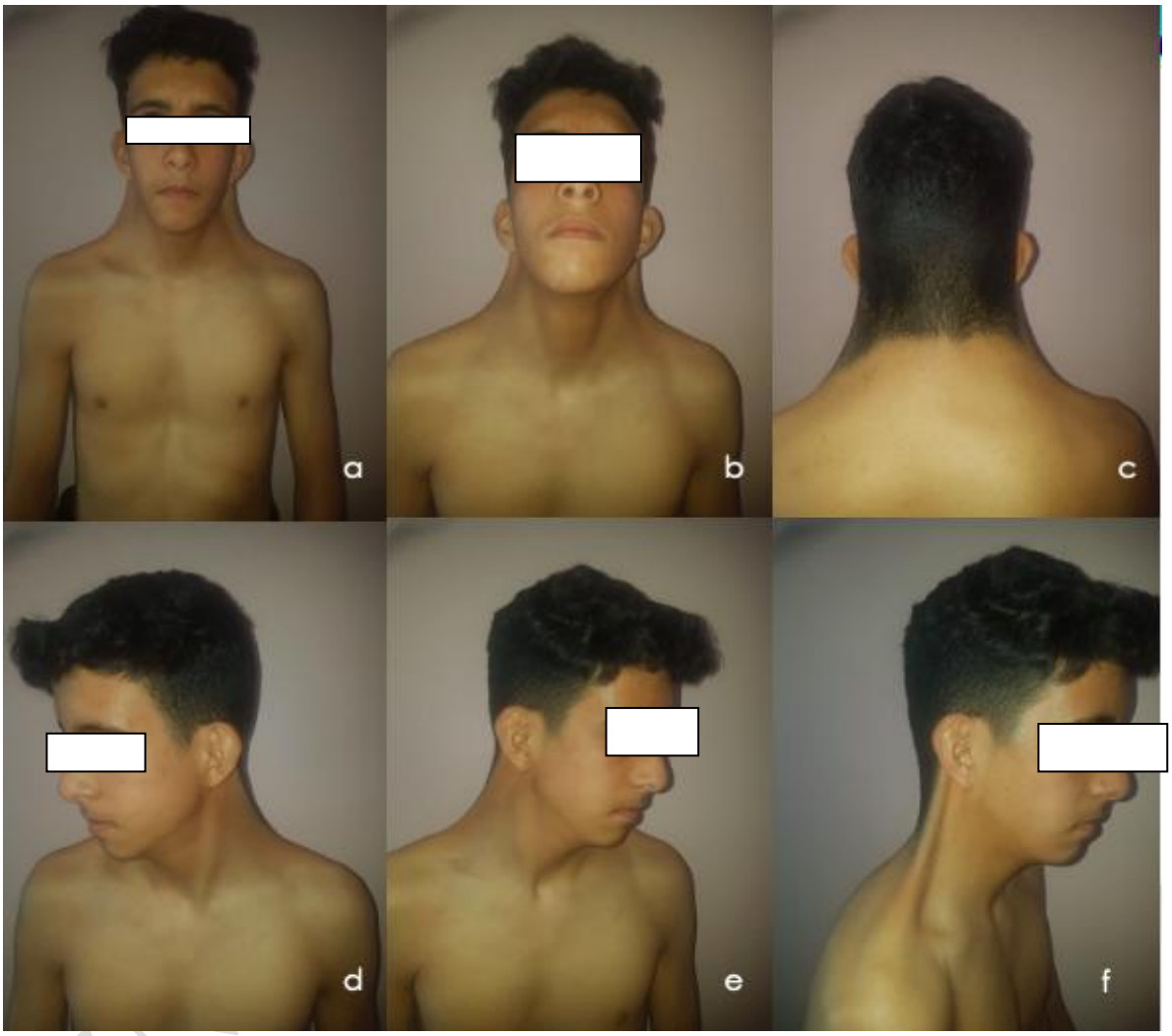

Figure 1: 19-year-old patient with webbed neck deformity and protruding ears, preoperative views:
a:Front view photo
b: Front view with neck extension
c:Back view
d, e, f: lateral views showing thick band limiting rotational head movements

III- The surgical procedure:

The surgical procedure involved dissection of subcutaneous flaps, followed by partial skin resection to eliminate excess vertical skin and pilosity. Radial incisions were made in the flaps to enhance rotation our incision was extended along the post-auricular groove, the vertical part of the band, and the hairline at the back of the head.

Two large flaps were dissected in subcutaneous planes using an electric scalpel, to isolate and subsequently transpose them. We then performed a partial skin resection to address the issue of excess vertical skin (similar to that seen in scar contractures), especially for flap B, which had densely haired skin. Finally, radial incisions were made on both flaps (where thick, fibrous, and adipose tissue was encountered) to increase the range of rotation and prevent relapse.

The platysma played no role in the malformation and was neither thick nor excessive. Scarring was located in the retro-auricular region, on the posterior trichion, and to a lesser extent on the anterior border of the trapezius muscle. The quilting technique using Vicryl2-0 was deemed relevant to enhance flap adherence and ensure seamless continuity between the neck and shoulders. No drains were used.

The skin was sutured using Monocryl 4-0 without any drainage (Figure 2).

Figure 2: a: Preoperative drawing with Z plasty
Photos one-week postoperative showing significant improvement of the neck contour, an upper hair lineand free neck movement .
b:Front view photo
c:Back view
d, e, f: Lateral views

An anatomopathological examination revealed edematous fibroadipose tissue without histological anomalies.
Postoperatively, the patient developed hypertrophic inflammatory scars, silicone sheetswere advised for scar management and local anti-inflammatory injections, but limited usage underscores the significance of patient compliance and access to follow-up care.
One-year post-surgery, the patient exhibited improved neck and shoulder shape, free neck movement, and normal hairline with

inflammatory scars inflammatory scars that did not bother at all the patientwho no longer wanted to attend the follow-up appointments and chose to send us photos via telephone instead (Figure 3).

Figure 3: Photos sent by the patient one-year post-surgery, the patient exhibited improved neck and shoulder shape, and normal hairline and some inflammatory scars.
a:Front view photo
b:Back view
c, d, e: Lateral views
f: The patient is able to wear certain clothing

IV- Discussion:

Surgical correction of pterygium colli remains a challenging endeavor due to its rarity and diverse clinical manifestations. While our understanding of the condition has evolved since its first description in the late 19th century, optimal treatment strategies continue to be refined. Our case report contributes to this body of knowledge by

presenting a successful surgical approach using a modified Z-plasty technique.

The objectives of surgical intervention for pterygium colli encompass not only aesthetic improvements but also functional enhancement. The redistribution and excision of excess skin aim to restore a harmonious neck contour and alleviate limitations in neck movement. Additionally, the correction of low hairline plays a crucial role in achieving a normalized appearance[5—7].

Our patient's postoperative outcome reflects these multifaceted goals, as he now enjoys enhanced self-esteem, increased clothing options, and unrestricted neck mobility.

The etiology of pterygium colli remains elusive, with several hypotheses attempting to explain its development. The differential growth theory proposes that a discrepancy in growth rates between cervical and acromial regions during embryogenesis leads to the condition. Another theory suggests that embryonic cyst regression results in residual skin changes[5].

While these concepts provide insights into the potential mechanisms, they also underline the complexity of the anomaly.

In the realm of surgical techniques, the modified Z-plasty procedure offers distinct advantages for severe cases of webbed neck. By combining tissue excision, transposition, and radial incisions, this approach addresses both vertical excess skin and the fibroadipose tissue component. The technique's efficacy lies in its ability to provide simultaneous correction of multiple aspects of the anomaly, resulting in a comprehensive and satisfying outcome for the patient.

Comparative analyses of different surgical techniques underscore the importance of tailoring the approach to the severity of the condition. The "butterfly method,"[6] lateral and posterior advancement flaps, and tissue expansion techniques have all been explored[7—13], but they may not comprehensively address severe cases due to limitations in handling excess skin thickness and the extent of deformity.

Our modified Z-plasty technique overcomes these challenges by its ability to excise and transpose tissue effectively, yielding a notable improvement in both aesthetics and function.

The postoperative development of hypertrophic inflammatory scars in our case highlights the potential for complications in surgical correction. While silicone sheeting was advised for scar management,

its limited usage underscores the significance of patient compliance and access to follow-up care. Further research into scar prevention and management could contribute to optimizing the overall patient experience and outcome.

V- conclusion:

the surgical correction of webbed neck (pterygium colli) remains a specialized area within plastic surgery. Our case report offers valuable insights into the successful use of a modified Z-plasty technique for severe cases.

This approach not only addresses the multifaceted aspects of the condition but also holds the potential to become a recommended method in the management of pterygium colli.

Further studies and collaborative efforts are warranted to refine surgical strategies, minimize complications, and enhance the quality of life for individuals with this rare congenital anomaly.

VII- References:

[1] Kobylinski D. UebereineflughautähnlicheAusbreitung amHalse. ZeitschriftfürNaturgeschichte und Urgeschichte des Menschen1883;14:343.

[2] Funke O. Pterygium colli. Dtsch Z Chir1902;63:162.

[3] Tuner HH. A syndrome of infantilism, congenital webbed neck, and cubitus valgus. Endocrinology 1938;23:566.

[4] Bruin MD. Pterygium collicongenitum (congenital webbing). AmJ .
Dis Child 1928;36:333.

[5] Miller LB. Treatment of web neck in Turner's syndrome withtissue expansion. Ann Plast Surg 1990;24:447—50.

[6] Sherin Jr JC, DeFranzo AJ. Butterfly correction of webbed neckdeformity in Turner's syndrome. PlastReconstr Surg 1980;66:129—33.

[7] Agris J, Dingman RO, Varon J. Correction of webbed neckdefects. Ann Plast Surg 1983;11:299—307.
[8] Gargan, Thomas J. Web neck deformity in Turner syndrome. PlastReconstr Surg 1997;99:871—4.
[9] Rossillon D, De Mey A, Lejour M. Pterygium colli: surgical treatment. Br J Plast Surg 1989;42(2):178—83.
[10] Thompson SJ, Tanner NSB, Mercer DM. Web neck deformity:anatomic considerations and options in surgical management. Br JPlast Surg 1990;43:94—100.
[11] LeandrisM,RicbourgB.Surgicaltreatmentofpterygiumcolli.A casereport and review of the literature. Ann ChirPlastEsthet1997;42(6):615—22.
[12] Qian JG, Wang XJ. Noonan syndrome and correction of thewebbed neck. Principio del formulariFinal del formular. Ann PlastSurg 2007;60(3):316—9.
[13] Khalifa MM, Graham G. New dominant syndrome of pterygiumcolli, mental retardation, and digital anomalies. Am J Med Genet1994;52(1):55—7.