Inverted Nipple: Contemporary Techniques

İçe Dönük Meme Başı Hastalığı: Güncel Teknikler

[1]Umut Tuncel, [1]Aydın Turan, [2] Selçuk Aytac, [3]Rıza Kanturk, [3]Ufuk Aydın, [1]Naci Kostakoglu

[1]Gaziosmanpaşa Üniversitesi Tıp Fakültesi, Plastik Rekonstrüktif ve Estetik Cerrahi Anabilim Dalı

[1]Evliya Çelebi Devlet Hastanesi, Plastik Rekonstrüktif ve Estetik Cerrahi Kliniği

[3]Edirne Devlet Hastanesi, Plastik Rekonstrüktif ve Estetik Cerrahi Kliniği

Sorumlu Yazar:

Yrd. Doç. Dr. Umut TUNCEL

[1]Gaziosmanpaşa Üniversitesi Tıp Fakültesi, Plastik Rekonstrüktif ve Estetik Cerrahi Anabilim Dalı
Tel: 05327249384

Fax: 03562133179

E-mail: drumuttuncel@gmail.com

Özet

İçe dönük meme başı hastalığı fonksiyonel ve kozmetik sorunlara neden olabilen bir malformasyondur. Bu malformasyon meme ucunda iritasyon ve enflamasyona neden olabileceği gibi, ileri ve kalıcı vakalarda süt vermeye de engel olabilir. Buna ek olarak meme başı içe dönüklüğü olan kadınların çoğu estetik görünümle ilgili olarak kendilerini iyi hissetmezler. Bu soruna neden olan ana sebepler meme başı altındaki bağ doku retraksiyonun yoğunluğu ile destek dokunun yetersizliğidir. Bu makalede, güncel teknikler ve farklı operasyon metodları hakkında okuyucuya literatürle ilgili bilgi vermek amaçlanmıştır.

Anahtar Kelimeler: İçe dönük meme başı, tedavi, teknik

Abstract

Inverted nipple is a malformation which can lead to functional and cosmetic problems. As well as it can be a source of irritation and inflammation for nipple, in cases of persistently inverted nipple, it may prevent lactation as well. Also, many women who have nipple inversion are aesthetically distressed by its appearance. The main reasons leading this problem are the intensity of retraction beneath the nipple and the degree of insufficient bulkiness of connective tissue underlying the nipple. In this article, we aimed to review of the literature regarding currently introduced techniques and acknowledge about the operation methods to the readers.

Key Words: Inverted nipple, treatment, technique

Introduction

Nipple malformations occur due to congenital or acquired conditions that may cause various cosmetic, psychological, breast feeding, sexual, and hygienic problems (1,2). The congenitally inverted nipple is not an infrequent pathology, and it is reported as many as 8% of the female population affected in the literature (2). An optimal correction of inverted nipple requires symmetry in position, size, shape, and permanent projection. Although many techniques for this purpose have been suggested up to now, there are insufficient data presented to accurately compare outcomes. Early antenatal non-surgical treatments have been advocated to facilitate breast feeding, including breast shells (3), Hoffman's exercises (4), breast pumps (5) and syringe techniques (6,7). However, the beneficial effects of such these non-surgical treatments are controversial because the normal physiologic development of the nipple during pregnancy often results in spontaneous protraction and enabling breast feeding. In addition, many surgical procedures for correcting inverted nipples have been introduced since 1850 with improved effectiveness (3). The surgical procedures can be classified into two groups, depending on whether the lactiferous ducts are protected. For example, the Namba technique involves the creation of a tight neck at the nipple base with three simple half–Z-plasties without sacrificing the duct system or adding bulk to the nipple to maintain nipple projection, whereas, all the lactiferous ducts are cut and the dermal flaps are used as supportive bulk under the nipple with the Teimourian technique (1).

The present article aims a review of the literature, exploring the techniques described for inverted nipple correction, comparing reported outcomes and complications. Some authors and techniques used is summarized in table 1.

Authors	**Technique**
Teimourian and Adham	Teimourian technique, 1980.
Hyakusoku et al.	Square flap method and dermal sling, 1988.
Yamamato and Sughira	Modified star flap technique, 1997.
Sakai et al.	Deep vertical incision, 1999.
Cristenu	Blocking notch knot, 2000.
Scholten	Body jewelery, 2001.
Huang	Three periductal dermatofibrous flaps method, 2003.
Lee et al.	Internal slide-wall suture, 2003.
Kim et al.	Triangular areolar dermal flaps, 2003.
Serra-Renom et al.	Internal 5-point star suture, 2004.
Yamada et al.	Artificial dermis, 2004.
Ritz et al.	Longitudinal dernatofibrous flap, 2005.
Burn and Kin	Areolar-based dermal flaps, 2007.
Wu et al.	Triangular areolar dermatofibrous flaps, 2008.
Min et al.	Triangular flap, 2008.
Kolker and Torina	Purse-string suture, 2009.

Table 1. Authors and techniques

Discussion

Up to 10 percent of the female population is affected on one or both sides (8,9). Inverted nipples are most commonly congenital, but inversion can occur secondarily to mastitis, macromastia, breast reduction surgery, or carcinoma. The anatomic defect lies in the relative shortness of the lactiferous ducts, which tether the nipple and prevent it projecting (9). Inverted nipples can be treated by various surgical or non-surgical methods, but the relationship between the grade of the deformity and the appropriate surgical procedure has an important role for providing optimal and satisfying results. Nipple inversion can be defined as nipples that lie on the same plane or on a lower plane than the areola due to shortened lactiferous ducts embedded in short fibrous bands that tether the nipple. The severity of the inversion is commonly graded using the grading system by Han and Hong (2). The grading of inverted nipple is made by preoperative evaluation of severity of inversion (3). In grade I, the nipple is easily pulled out manually and maintains its projection quite well. Grade I nipples are believed to have minimal fibrosis; thus, manual traction and a single, a traction or suspension suture are enough for the correction. In grade I cases, there is no soft-tissue deficiency of the nipple. The lactiferous duct should be normal without any retraction. The majority of inverted nipples belong to grade II. In grade II, the nipples can be pulled out but cannot maintain projection and tend to go back again. These nipples are thought to have moderate fibrosis beneath the nipple. Blunt dissections for surgical release can be carried out until the inversion does not recur after releasing the traction. Grade II nipples have a moderate degree of fibrosis. The lactiferous ducts are mildly retracted but do not need to be cut for the release of fibrosis. On histological examination, these nipples have rich collagenous stromata with numerous bundles of smooth muscle. The lactiferous ducts can be identified and preserved, permitting proper release of fibrotic bands in grade II nipples. A temporary traction suture is generally used after surgery. In grade III, the nipple can hardly be pulled out manually. Severe fibrosis makes it impossible to reach optimal release of the fibrotic band with the preservation of the ducts. The fibrotic bands are widely dissected, and the lactiferous ducts are cut, especially in the central portion. The fibrosis is remarkable and lactiferous ducts are short and severely retracted. The bulk of soft tissue is markedly insufficient in the nipple. Histologically, there are atrophic terminal duct lobular units and severe fibrosis. Two or three deepithelialized dermal flaps may be used to make up for soft-tissue deficiency; a traction suture is also used. This grading system is useful for patient classification and analysis, systematic planning, and application of the surgical procedures (1).

Numerous surgical and non-surgical techniques have been introduced and among these, popular ones of are the incision-release and tremendous local flap methods. The incision-release technique involves manual eversion of the nipple, the placement of a periareolar incision and dissection of the fibrous bands and/or the lactiferous ducts that are felt to be restricting the nipple. Modifications to this basic approach can be used to maintain eversion with buried sutures, bolster sutures, purse-string sutures, grafts, and splinting. Reported splint materials range from using half a ping-pong ball to a personalized thermoplastic mold (8,9).

Scholten used body jewelry method for the correction of nipple inversion that provides contemporary treatment of the deformity (3). In addition the main advantage of this method is that it can protect lactiferous ducts thus preserving the possibility of breast feeding. In a similar study, the authors used Pitanguy's surgical method in 28 patients which have grade II inverted nipples, combining it with the use of a round splint designed by Thermoplast (10,11). The aim of this combination was to prevent relapse of the inversion because the surgical method used depended on releasing of the fibrous tissue between the ducts alone. Similarly, there are a number of reports which suggest using postoperative fixation and suspension after the surgical intervention. In this context, Hyakusoku and Chin introduced using C and L-shaped piercing materials for obtaining these two purposes (12). The authors used this device for 6 months postoperatively and they recommended that 3 weeks is a suitable duration for piercing after a good shape is obtained from the operation, otherwise 3 months is better if a good shape is not obtained from the operation. Another minimally invasive method is purse-string suture method. In this technique, the suture takes place through a minimal-access release site, and sequential reinsertion of suture through stitch exit points. The method was used for 58 inverted nipples by Kolker et al (13). The main advantage of this technique is the using minimal-access release of fibro-ductal elements with an 18-gauge needle. However the authors encountered recurrence rate of 22% (13 cases of 58 nipples). These cases were in grade II and III groups. A similar one is 5-point star suture technique (14). This technique was used in 12 patients in grade III and obtained satisfactory results. In this technique, after the fibrous bands are cut, 5-points star suture is used to obtain long lasting results however the authors did not note follow-up duration for these 12 patients. The other suture technique introduced currently is "arabesque shape suture'' technique which was used by Sapountzis et al. in 2012 (15). In this method, four 0.5 mm incisions are made and the erector muscle of the nipple and the lactiferous ducts are dissected, thus, sectioned by a small scissors. A loop stitch with an arabesque-like shape is made as the suture is coming in and out of the dermis. The inner knot is placed within the interior of the cylinder of the nipple. The second suture for the 3 and 9 o'clock set is made exactly the same way. Finally, the cutaneous incisions are closed by 6/0 nylon, and a dressing is applied to maintain the eversion of the nipple. No complications such as hematoma, bleeding, or nipple necrosis and alteration in nipple sensation were reported with this tecnique. During the follow-up period (3 months to 1 year), all the nipples remained everted and symmetric except in two cases of recurrence during the early postoperative period.

For women hoping to breast-feed, so that selective dissection of fibrous bands without damaging the lactiferous ducts is challenging, less invasive methods should be considered. Chen et al. popularized the endoscopic technique in 2007. They aimed to both minimize operation scar and maintain lactation in grade I and II cases (16). In this technique, an 8-mm incision is used, which allows selective dissection of fibrous bands with an 82% success rate for maintaining eversion. In a similar study by Crestinu, the author corrected the five nipples for the purpose of breast feeding. All patients in that study went on to breast feed successfully (9). Lee and Cho used

the Namba technique with their modification (17-19) (Figure 1).

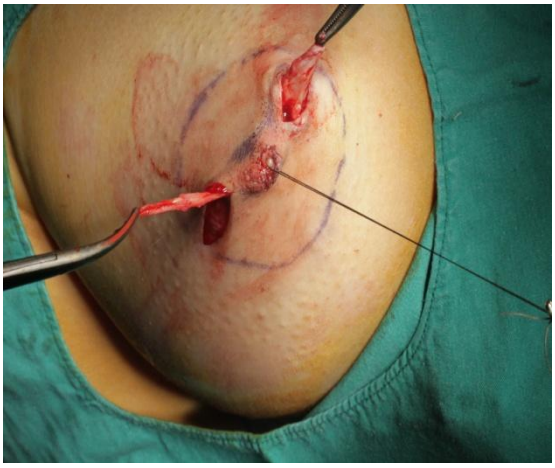

Figure 1. Surgical treatment of inverted nipple.

Many of the flap descriptions over the last two decades are modeled on the Teimourian technique that uses two triangular flaps-tunneled and approximated below the nipple to fill the dead space and achieve eversion (20). Despite preservation of the duct system is difficult in severe grade III cases, the modified Namba technique can also be recommend to patients who may wish to breast feed, because the duct system is preserved (19). The modified Teimourian technique is usually reserved as a final solution. This technique creates a tight neck at the nipple base with three simple half Z-plasties, which gives adequate projection and has the advantage of allowing lactiferous ducts to be preserved (2). Lee and Cho used the technique with dermal flaps, achieving a success rate of 56% at 2 years. Megumi described a similar technique the author used periductal fibrous flaps that preserves lactiferous ducts. In that case series of 76 nipples, a success rate of 88% was demonstrated maintaining eversion at follow-up. No comment was made on lactation (2).

Burn and Kim used four dermal flap procedure on 28 nipples in 17 patients (21). The patients were in the grade II and III in that study. The authors suggested that if the bases of the dermal flaps are placed on the areola, supporting by the compact subcutaneous tissue and the mammary gland, these flaps may strongly resist scarring and retraction forces and may support the nipple more effectively. There were no surgical complications such as traction pain, infection, hematoma, permanent numbness, or skin necrosis in follow-up at 3 to 8 months and revealed no evidence of recurring inversion. In that procedure, unsatisfactory aesthetic projection occurred in one case of moderate inversion caused by early bra wearing without nipple protection. Another areola based flap technique used is dermoglandular rhomboid advancement technique (22). This method was used by Taylor et al. in 20 patients with successful results in grade II and III cases. In that study, only one patient had unilateral recurrence and underwent correction with the same method. The authors proposed two modifications to the dermal flap technique. Firstly, the rhomboid dermal flaps are designed solely on the areola, the bases directed peripherally, improving vascularity and allowing true medial advancement. Secondly, the lactiferous ducts and tethering fibrous bands are released in a conical fashion allowing closure with a vertical VY advancement. The authors suggested that these can give better projection and support to the nipple proper with medial recruitment of glandular tissue closing the dead space created.

Also, there are numerous nipple-based flap techniques in the literature. One of these is triangular dermal flap technique (23). Compared with other techniques, the described technique does not involve areolar skin. Instead, triangular dermal flaps are elevated under the areolar skin,

which overcomes the visible scarring issue. The technique was used in 87 inverted nipples and no complications or recurrences were encountered, resulting scars were almost invisible. All patients were satisfied with their postoperative results. The other nipple based flap techniques were used by Huang et al (24,25), Ritz et al. (26) and Kim et al. (27). Huang et al proposed triangular areolar dermatofibrous flap in especially severely inverted nipples. In this technique, the retracting ducts and fibrous bands beneath the nipple are released with blunt dissection. It is required to take care preserving the lactiferous ducts. If the nipple is not free after these dissections, all the retracting ducts are transected so as not to restrict the nipple. The broad triangular flaps on both sides of the inverted nipple are advanced through the tunnel beneath the nipple as the filling tissue for the dead space. The tip of each flap is fixed with the base of another flap. Because the length of the flap is shorter than the diameter of the areolar external circle, the fixations reduce the distance of the opposite sides. This not only tightens the nipple neck but also reduces the distance to the opposite side. A ‘‘donut’’ dressing then is applied to avoid compression of the nipple. Continuous traction of the nipple lasts 2 weeks. Min et al reported a triangular flap method that leaves no visible scars. In that technique, triangular areolar dermal flaps are elevated under the areolar skin, which overcomes visible scarring and thus can be used regardless of areola size without causing deformation. This technique was used to correct 87 inverted nipples with no recurrences, and all patients were satisfied with the postoperative results (28). Ritz et al. (26) reported a modification of the Teimorian method, in which two longitudinal flaps were created from a doughnut-shaped, deepithelialized area surrounding the nipple. After 2-year follow-up, an 89% success rate was shown, with two grade III nipples needing reoperation. Yamamoto et al. (29) reported on small case series using a star-shaped flap with multiple points that preserved the ductal system. That series had 100% success rates and aesthetically pleasing nipples, but the method inevitably inflicted more scars upon the areolar than other equally successful techniques (28,29). In 2005, Kim et al. used triangular dermal flap with twisting and locking principles (30). In this technique, three diamond flaps, set at 120-degree intervals, are placed on three concentric circles drawn at the areola. Deepithelialization is performed on each designed area. A dermal flap is elevated from each deepithelialized area and fibrotic bands beneath the nipple are sufficiently released. This method was used in 15 patients and in a period of 14 months follow-up there were no major complications or relapse. Therefore, triangular flap technique is reported successful results. The method suggests that it is an ideal surgical procedure for the severely inverted nipple cases owing to provide bulky enough to fill beneath the nipple and with a suspension effect to protect from early relapse.

Among different techniques telescope method (31), monolobed dermal flap (32) and the use of artificial dermis (33) have been introduced in the literature. In the telescope technique, one circular incision is made in the areolar area and the nipple is pulled out with a stay suture. Two small triangular wedge resections of the areolar skin and underlying soft tissue are made at the 3 and 9 o’clock positions, followed by reapproximation of the wound edges to create a cylindrical shape and ideal size for the raised nipple. The

mobilized nipple–areola complex is maintained at the desired height by three sutures between the deep stalk and outer subareolar breast tissue with 4-0 Vicryl at 120^0. Four more substantial sutures, superficial to the previous sutures, are placed between the stalk and deep dermal layer of the outer areola at the 3, 6, 9, and 12 o'clock positions. An annular purse-string suture in the deep dermal layer of outer areola is placed to narrow the neck area. With using this technique, the authors did not declare recurrence of nipple inversion and sensory disturbance during the postoperative period. Another alternative technique is two VY advancement flap method (34). Nipple is disinvaginated with a traction suture and the lines of V-shaped incision are drawn. Dermoglandular tissue is lifted as a V and then moved forward, thereby decreasing tension. Direct closure of the apex creates a Y-shaped suture line. The authors treated 52 patients using this technique and follow-up period was an average of 3 years. They suggested the technique to be an ideal procedure for correcting moderate and severe inverted nipple; the use of an easy to perform VY dermoglandular flap ensures nipple protrusion and support, lactation, and minimal scars. Also, in grade II and III recurrent cases, Bracaglia et al suggested using two U-stitches technique with successful results (32). In this technique, the inverted nipple isolated from underlying parenchyma, cutting the ducts and the fibrous tissue. Then two U-stitches, at 3 o'clock and 9 o'clock, are transfixed at the base of the nipple and tightened to cause a stable extroversion, then two monolobed flaps are overturned and sutured together under the nipple. The donor site is closed primarily. The other method used currently is artificial dermis graft. Yannas and Burke (35,36) firstly reported a bilayer artificial dermis made up of a collagen sponge for using in diverse clinical needs. Yamada et al. (33) also used this method for 4 inverted nipple cases in two patients. In this method, two incision lines of 1.5 cm are made at the 3 and 9 o'clock positions along the edge of the areola. Once contracted fibrotic tissue is separated from the lactiferous ducts, the ducts are extended until the nipple is free and capable of complete eversion. At this stage, the nipple is held in a completely projected position without traction. Artificial dermis is reshaped to fit the soft tissue deficiency. As well as the technique can form the bulk necessary to support the nipple and preserving contracture, because it is not necessary to cut all the lactiferous ducts in this procedure, so, theoretically, there was no disturbance to lactation (33). The authors suggested that the results were satisfactory with regard to the shape and projection of the nipples for both patients and surgeons. In addition, there were no noticeable scars, no episodes of infection, and no deformities of the areola, the nipple sensations, or the contracting functions of the areolar muscle.

Although satisfactory outcomes have been reported with most surgical or non-surgical techniques, each method carries some problems including sensory disturbance of the nipple, scarring of the nipple areola and donor site, destruction of breast function, and insufficient correction. In conclusion, optimal surgical procedure for the moderate or severely nipple inversion cases should be simple and reliable, with a low rate of recurrence. It should provide a satisfying shape, projection enough and preserve ductal function if the women particularly hope to breast feeding.

References

1. Han S. The inverted nipple: its grading and surgical correction. Plast Reconstr Surg. 2000;105:1576.
2. Serra-Renom J, Fontdevila J, Monner J. Correction of the Inverted Nipple with an Internal 5-Point Star Suture. Ann Plast Surg. 2004;293-6.
3. Scholten E. A contemporary correction of inverted nipples. Plast Reconstr Surg. 2001;107:511-3.
4. Gangal, HT, Gangal MH. Suction method for correcting flat nipples or inverted nipples. Plast Reconstr Surg. 1978;61:294.
5. McGeorge DD. The "Niplette": An instrument for the non-surgical correction of inverted nipples. Br J Plast Surg. 1994;47:46.
6. Arsenault G. Using a disposable syringe to treat inverted nipples. Can Fam Physician. 1997;43:1517.
7. Teimourian B, Adham N. Simple technique for correction of inverted nipple. Plast Reconstr Surg. 1980;65:504.
8. Park HS, Yoon CH, Kim HJ. The prevalence of congenital inverted nipple. Aesth Plast Surg. 1999;23:144.
9. Crestinu JM. The correction of inverted nipples without scars: 17 Years' experience, 452 operations. Aesthetic Plast Surg. 2000;24:52-7.
10. McCarty J. Plastic Surgery: Vol. 6. The trunk and lower extremity. Phladelphia: Saunders, 3864-3872, 1990.
11. Fabio C, Domenico V, Chiara AA, Francesco K. Inverted nipple: Use of an effective and personalized splint after surgical correction with Pitanguy's technique to avoid relapse of the inversion in 28 cases. Plast Reconstr Surg. 2008;121:139-40.
12. Hyakusoku H, Chin T. Uselfulness of the nipple-suspension piercing device after correction of inverted nipples. Aesth Plast Surg. 2006;30:396-8.
13. Kolker AR, Torina PJ. Minimally invasive correction of inverted nipples: a safe and simple technique for reliable, sustainable projection. Ann Plast Surg. 2009;62:549-53.
14. Serra-Renom J, Fontdevila J, Monner J. Correction of the inverted nipple with an internal 5-point star suture. Ann Plast Surg. 2004;53:293-6.
15. Sapountzis S, Kim JH, Minh P, Hwang YS, Baek RM, Heo CY. Correction of inverted nipple with "arabesque"-shape sutures. Aesth Plast Surg. 2012;36:339-42.
16. Chen SH, Gedebou T, Chen PH. The endoscope as an adjunct to correction of nipple inversion deformity. Plast Reconstr Surg. 2007;119:1178-82.
17. Teimourian B, Adham MN. Simple technique for correction of inverted nipple. Plast Reconstr Surg. 1980;65:504-6.
18. Lee HB, Roh TS, Chung YK, Kim SW, Kim JB, Shin KS. Correction of inverted nipple using strut reinforcement with deepithelialized triangular flaps. Plast Reconstr Surg. 1998;102:1253-8.
19. Lee KY, Cho BC. Surgical correction of inverted nipples using the modified Namba or Teimourian technique. Plast Reconstr Surg. 2004;113:328-36.
20. Pompei S, Tedesco M. A new surgical technique for the correction of the inverted nipple. Aesthetic Plast Surg. 1999;23:371-4.
21. Burm JS, Kim YW. Correction of inverted nipples by strong suspension

with areola-based dermal flaps. Plast Reconstr Surg. 2007;120:1483-6.
22. McG Taylor D, Lahiri A, Laitung JK. Correction of the severely inverted nipple: areola- based dermoglandular rhomboid advancement. J Plast Reconstr Aesthet Surg. 2011;64:297-302.
23. Min KH, Park SS, Heo CY, Min KW. Scar-free technique for inverted-nipple correction. Aesthetic Plast Surg. 2010;34:116-9.
24. Wu HL, Huang X, Zheng SS. A new procedure for correction of severe inverted nipple with two triangular areolar dermofibrous flaps. Aesthetic Plast Surg. 2008;32:641-4.
25. Huang WC. A new method for correction of inverted nipple with three periductal dermofibrous flaps. Aesthetic Plast Surg. 2003;27:301-4.
26. Ritz M, Silfen R, Morgan D, Southwick G. Simple technique for inverted nipple correction. Aesthetic Plast Surg. 2005;29:24–7.
27. Kim DY, Jeong EC, Eo SR, Kim KS, Lee SY, Cho BH. Correction of inverted nipple: an alternative method using two triangular areolar dermal flaps. Ann Plast Surg. 2003;51:636-40.
28. Yamamoto Y, Furukawa H, Oyama A. Two innovations of the star-flap technique for nipple reconstruction. Br J Plast Surg. 2001;54:723-6.
29. Yamamoto Y, Sugihara T. Correction of inverted nipple with modified star flap technique. Aesthetic Plast Surg. 1997;21:193-5.
30. Kim JT, Lim YS, Oh JG. Correction of inverted nipples with twisting and locking principles. Plast Reconstr Surg. 2006;118:1526-31.
31. Shiau JP, Chin CC, Lin MH, Hsiao CW. Correction of severely inverted nipple with telescope method. Aesthetic Plast Surg. 2011;35:1137-42.
32. Bracaglia R, Tambasco D, Gentileschi S, D'Ettorre M. Recurrent inverted nipple: a reliable technique for the most difficult cases. Ann Plast Surg. 2012;69:24-6.
33. Yamada N, Kakibuchi M, Kitayoshi H, Kurokawa M, Hosokawa K, Hashimoto K. A method for correcting an inverted nipple with an artificial dermis. Aesthetic Plast Surg. 2004;28:233-8.
34. Persichetti P, Poccia I, Pallara T, Delle Femmine PF, Marangi GF. A new simple technique to correct nipple inversion using 2 V-Y advancement flaps. Ann Plast Surg. 2011;67:343-5.
35. Yannas IV, Burke JF. Design of an artificial skin: I. Basic design principles. J Biomed Master Res. 1980;14:65-81.
36. Kurihara K, Maezawa N. Surgical correction of the inverted nipple with a tendon graft: Hammock procedure. Plast Reconstr Surg. 1990;86:999-1003.