

Umbilical Reconstruction in Children: A Simplified Operative Technique

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Received: 13 January 2015 / Accepted: 22 February 2015 / Published online: 12 March 2015
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Abstract The umbilicus has a paramount aesthetical function for the abdomen and when removed due to a surgical procedure, an umbilicoplasty is mandatory: indeed, its absence could contribute to the development of psychological disorders, especially in childhood. Herein, we describe a straightforward technique to obtain a seemingly natural umbilical scar. This technique, easily taught in a general pediatric surgery environment, may be amenable for any kind of umbilical reconstruction.

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Keywords Umbilicus · Umbilical reconstruction · Abdominoplasty

Introduction

The umbilicus represents the only aesthetic scar on the surface of the body on the anterior abdominal wall which is the evolution of umbilical cord detachment that occurs about 2 weeks after birth. In patients in whom the umbilicus is deformed or removed because of a surgical procedure,

umbilical reconstruction can be amenable because its absence may contribute to psychological disorders [1], especially in pediatric patients. Umbilical reconstruction has been envisioned for several pathologies such as urachal



Fig. 1 A case of a two-year-old baby girl who presented to our department with a complicated congenital urachal sinus, resulting in an oozing umbilicus with purulent secretion. This condition led within time to the development of an umbilical granuloma which was occupying the whole navel area

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sinus (Fig. 1) [2], urachal cyst [3], umbilical hernia [4], bladder exstrophy [1], omphalocele undergone surgical correction [5], malignant melanoma [6], and Cantrell's syndrome [7]. Whenever sacrificed, cosmesis is a priority, hence a procedure which entails a reconstruction of a resemblant umbilicus should be offered [1] either during the same operative time or at a later stage. Although far from ideal, various methods have been devised to reconstruct the umbilicus [5]. When in need of an umbilical surgical reconstruction, it is considered preferable to perform this operation before school age: making sure to devote special attention to both patients' self-esteem and their parents' sensibilities, although it should be noted that it is more challenging to recreate a deep umbilicus in toddlers rather than in older children [11]. In this technical report, we describe a straightforward umbilical reconstruction method which would be easily taught in a general pediatric surgery environment.

Operative Technique

The skin is incised very close to the umbilical edge in order to excise the least skin possible, and suspended 3.0 or 4.0 polydioxanone stitches are applied laterally to pull the umbilical scar (Fig. 2a, b). The access to the abdominal cavity allows complete excision of the umbilical stump (Fig. 2c, d). Abdominal fascia is then sutured by transversal interrupted polyglactin 2.0 stitches (Fig. 2e). To create a neoumbilicus, a crosswise hook 4.0 PDS stitch is applied in the fascia, right where the inner part of the neoumbilicus should reside (Fig. 3b, c). This stitch anchors both the opposite cutaneous edges and the abdominal fascia (Fig. 3d item 2). An intradermic purse string (Fig. 3b–d) is fashioned all around the dermic edge in 4.0 PDS (Figs. 2f, 3d item 1). In sequence, the purse string is pulled and secured and then the perpendicular stitch is tied: this maneuver allows the progressive circular shrinkage of the skin

Fig. 2 The operative technique

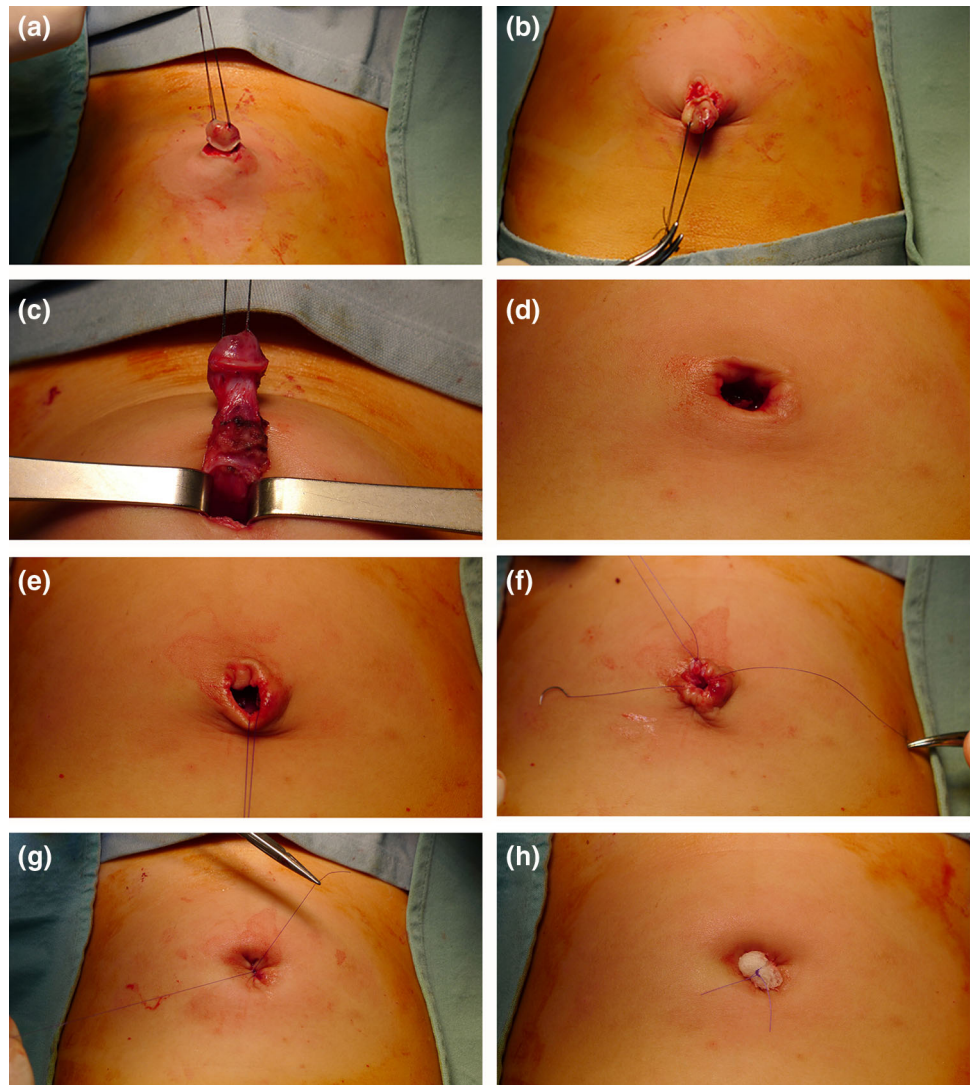


Fig. 3 Schematic illustration of the operative technique

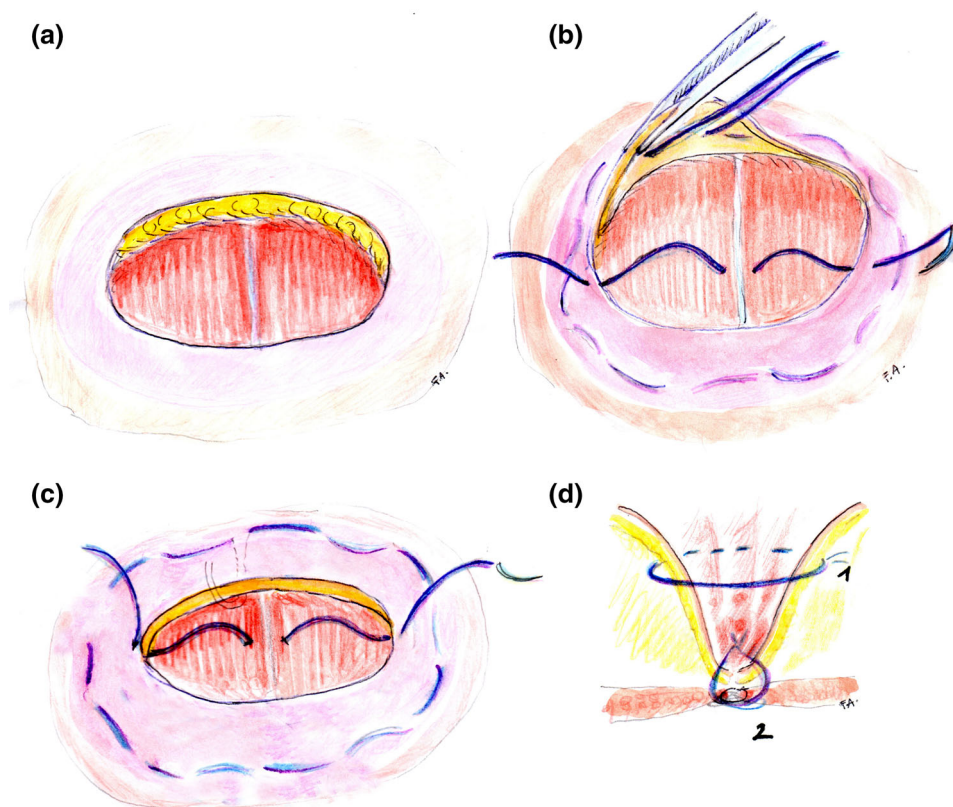


Fig. 4 The umbilical scar 6 months after the operation

edges which converge toward the fascia thus giving to the newly formed umbilicus a look similar to a physiological umbilical scar (Fig. 2g, h).

Discussion

The umbilicus is a cosmetic scar which consists of an ideal front-facing depression, usually located between the median sagittal and the bisiliac line [8]. To preserve the aesthetic look of the umbilicus, surgeons have to consider its anatomical features consisting of a ring, a tubular wall, a groove, and a bottom without any skin excess [9]. The surgical reconstruction of the umbilicus is performed in highly varying situations: from an extreme inadequacy to abundance of available skin or in the presence of scarred tissue.

For example, in giant omphaloceles, it is possible to reconstruct the abdominal wall without the need for prosthetic material, resulting in lower infection rates and reducing the formation of dense adhesions [10]. When the presence of adequate skin allows for reconstruction (i.e., umbilical hernia or urachal sinus), various operative techniques have been proposed. Among these, it is worth mentioning the “tubularized trapezoid flap neoumbilicoplasty”, primarily used in bladder exstrophy [1],

umbilical reconstruction using a “reverse fan-shaped flap” [11], a technique with two opposing skin flaps, an upper inverted omega-shaped flap and a lower “Lazy M”-shaped flap [12], another technique using three triangular skin flaps and an excision of a diamond-shaped skin flap [4]. However, these procedures require certain acquaintance with proportions as well as additional incisions. As the level of complexity of the procedure increases, so does the risk of complication and this may have a direct effect on the final aesthetic outcome due to external incisions.

With this technique, we successfully operated on more than ten children reporting no complications (Fig. 4). In our description, the “purse string” technique gives a three-dimensional natural umbilicus without external scarring in which adequate depth is easily and safely obtained and a satisfactory outcome is achieved from an aesthetic standpoint.

Conflict of interest The authors declare that they have no conflicts of interest to disclose.

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