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ORIGINAL ARTICLE

Superficial fascial system repair: an abdominoplasty technique to reduce local complications after caesarean delivery

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Abstract Abdominal incision complications are a major source of morbidity after caesarean delivery. Repair of the superficial fascial system may avert local complications after caesarean delivery by minimising tension to the skin and increasing the initial biomechanical strength of wound which has the potential to decrease early wound dehiscence and as a by-product correct suprapubic bulging.

Keywords Superficial fascial system · Caesarean section · Abdominoplasty

Introduction

Abdominal incision complications are a major source of morbidity after caesarean delivery [1, 2]. They also create significant emotional and economic burdens in obstetric care. The postpartum period is a challenging time for women and a postoperative wound complication further intensifies an already difficult period of adjustment. The economic burden is difficult to quantify but is likely significant.

Several useful transverse abdominal incisions are available to the surgeons performing obstetric and gynaecologic surgery. Historically, the obstetrician–gynaecologist has preferred this type of incision including Pfannenstiel's incision.

Failure of the skin incision to heal commonly occurs because of infection, abscess, haematoma formation, seroma formation [1–13]. The incidence of wound complications in the obstetric population varies in the literature, with rates ranging from 2.8 to 26.6% [1–13]. These wound complications and others such as suprapubic ptosis and suprapubic scar depression with soft tissue bulging, remain a major concern for women undergoing caesarean delivery [1, 2].

Abdominoplasty has evolved as a very effective body contouring procedure [14, 15]. These complex procedures, which were designed for moderate to severe skin laxity of the trunk and for patients with lax inguinal and upper thigh tissues, produce dramatic improvements in skin tightness and more natural aesthetic contours [14, 15]. Could the application of an abdominoplasty concept reduce local complications after caesarean delivery?

Superficial fascial system

Classical abdominoplasty, including repair of musculofascial flaccidity primarily treats the anterior abdominal wall [15]. The superficial fascial system (SFS) is the connective tissue network that resides below the dermis and provides the major structural support for the skin and fat of the body (Fig. 1) [16]. The SFS is a viscoelastic layer in possession of functional biomechanical properties [17]. The SFS provides the major structural support for the skin and fat of the body and repair of the SFS would be expected to diffuse the tension on the skin flap, lift areas of soft tissue ptosis, and provide long-lasting support [18].

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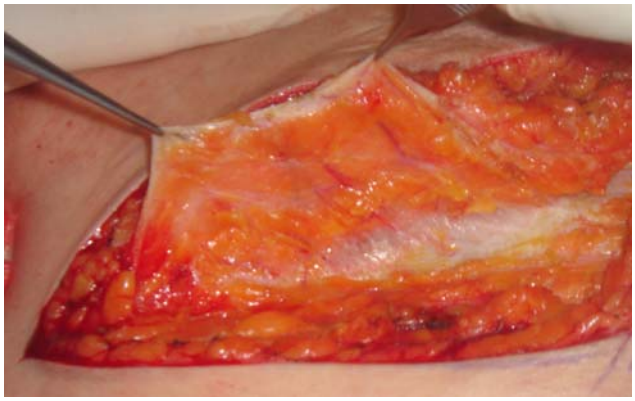

Fig. 1 Discrete superficial fascial system layer

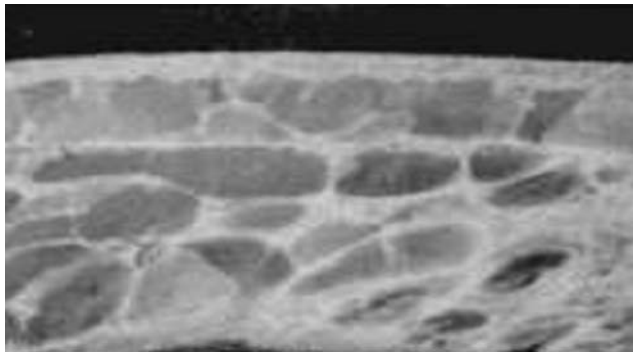

Fig. 2 Cross-section of a lower anterior trunk from a female cadaver. Multiple layers of the superficial fascial system surrounding a well defined, single fascial sheet with interconnecting fibrous septae from dermis to muscle fascia, encasing lobules of fat

Its description and surgical application has made a significant contribution to body contouring surgery. Lockwood popularised its use in various suspension procedures designed to improve body contour which include the lower body lift and the high lateral tension abdominoplasty [19–21]. It has been implicated as a pivotal structure in excisional [16, 19, 20, 22–24] and noninvasive [25, 26] body contouring procedures. Surgical repair of the SFS increases biomechanical strength of the surgical wound [17]. Lockwood also suggested that repair of the SFS results in a stable scar that heals without migration [16]. It has been claimed that SFS repair more effectively closes dead space, and, therefore, has the potential to reduce seroma formation [18] and decrease scar width, although this has not previously been quantified [16].

Observations verify what Lockwood and others have described to be the biomechanical role of SFS [17, 19, 20, 23–25, 27]. Repair of the SFS transfers tension from the dermis to the deeper tissues, minimising tension to the skin flap [17]. This biomechanical energy transfer is enhanced by the dermis-SFS junctional architecture (Fig. 2) [17]. The continuity of the dermis to the SFS ensures a direct energy transfer, and the oblique and vertical orientation of the SFS septae disperses the energy in a direction perpendicular to the wound tension [17]. A recent study demonstrated that repair of the SFS layer in addition to dermis repair significantly increases the initial biomechanical strength of wound repair early postoperative period, and is likely to be a strength layer even in the later stages of wound healing [17]. This has the potential to decrease early wound dehiscence [17]. This suggests the possibility of enhanced long-term tensile strength [17]. Tight closure of the SFS layer in addition to dermis of the abdomen corrects suprapubic bulging and creates a flatter stomach [17, 18]. Lockwood repaired the SFS with 2-0 polydioxanone (PDS) suture (Ethicon, Somerville, NJ), the deep dermis in interrupted fashion using 3-0 poliglecaprone 25 (monocryl) (Ethicon) followed by an intracuticular repair using 3-0 monocryl as well [16].

Discussion

Primary complications of Pfannenstiel incisions include, haematoma, seroma, epigastric bulging, and wound necrosis. The SFS provides the major structural support for the skin and fat of the body [16, 17]. Its description and surgical application has made a significant contribution to body contouring surgery [14, 15, 17]. We suggest that repair of the SFS may avert local complications after caesarean delivery by minimising tension to the skin and increasing the initial biomechanical strength of wound which has the potential to decrease early wound dehiscence and as a by-product correct supra-pubic bulging.

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