

Recurrent Breast Animation after Conversion from Dual Plane to Prepectoral Breast Implant Placement

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Summary: Conversion to a prepectoral implant pocket is considered the definitive treatment for breast animation after implant-based breast reconstruction. Although subtle movement of implants placed in the prepectoral plane may be noted on clinical examination by experienced surgeons, current data demonstrate complete resolution of animation deformity with prepectoral implant placement. We present the case of a middle-aged women who underwent breast implant pocket conversion from dual-plane to prepectoral plane for treatment of animation deformity. Although her postoperative recovery was unremarkable with initial resolution of animation, recurrent implant animation was evident on 3-month follow-up. Recurrent breast animation after conversion from dual-plane to prepectoral implant pocket is highly unusual and unreported in the current literature. Although revision surgery may identify potential causes, larger-scale research on contributing factors will be valuable in developing strategies to prevent recurrent animation after conversion to a prepectoral implant pocket. (*Plast Reconstr Surg Glob Open* 2023; 11:e5378; doi: 10.1097/GOX.0000000000005378; Published online 3 November 2023.)

Breast animation deformity is a common complication of implant-based breast reconstruction, particularly after submuscular implant insertion.¹⁻⁴ Superolateral movement of implant and skin on pectoralis contraction is thought to result from postoperative adhesions between the muscle, implant capsule, and skin.^{1,4,5} The resulting deformity may be distressing, particularly for mastectomy patients, as implant movement is more pronounced through their thinner skin envelopes. Conversion to a prepectoral implant pocket is considered definitive treatment for animation deformity, with demonstrated complete resolution of animation.²⁻⁶ In this report, however, we present the unusual case of a 60-year-old woman with recurrent breast animation after conversion from dual-plane to prepectoral implant placement.

CASE

A 60-year-old woman presented to the breast clinic with recurrent right breast implant animation after two-stage implant-based reconstruction. In 2012, she had a right nipple-sparing mastectomy with submuscular

tissue expander, exchanged to permanent implant-based reconstruction for right breast invasive ductal carcinoma. She did not receive radiotherapy. The patient experienced recurrent capsular contractures requiring three separate implant pocket revisions. Her last procedure was capsulectomy and dual-plane implant placement in 2013. She had remained well, but now presented for treatment of breast animation visible through her clothing. She lives independently, has a mildly active lifestyle, but does not exercise heavily. Clinical examination revealed Kim grade III right breast animation. (See **Video 1 [online]**, which shows the preoperative examination demonstrating right breast implant animation.) After discussion of various management options, she consented for conversion to prepectoral implant placement with fat grafting.

An inframammary incision was made, excess skin was excised, and the mastectomy flap was re-dissected. The 375 cm³ implant was removed with the capsule attached, and the pectoralis was released from overlying scar tissue and sutured to the chest wall and new inframammary fold. After sizing, a 255-cm³ gel implant was inserted into the prepectoral plane, separated from skin by titanium polypropylene mesh (TiLoop bra pocket), and fixed to the pectoralis. In total, 60 cm³ of fat harvested from the abdomen and thigh were grafted to the superior pole of the breast. Her

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postoperative recovery was unremarkable, and at 1 week, she had complete resolution of animation (**See Video 2 [online]**), which shows the 1-week postoperative review demonstrating resolution of right breast implant animation) and no postoperative seroma. On her 3-month review, however, she reported recurrent but milder animation on pectoralis contraction (Kim grade II) with new concomitant upward right anterior abdominal wall movement. (**See Video 3 [online]**, which shows the 3-month postoperative review demonstrating recurrent right breast implant animation with upwards anterior abdominal wall movement.)

DISCUSSION

Submuscular placement was the preferred pocket for implant-based reconstruction after mastectomy, as coverage by the well-vascularized pectoralis muscle is protective of the implant pocket if overlying skin necrosis develops.²⁻⁵ Submuscular placement was also said to produce less contour deformity and contracture compared with prepectoral placement.^{2,4,5} The incidence of animation deformity, however, is higher with submuscular pockets due to postoperative adhesions between the implant capsule, overlying muscle, and skin causing implant movement with pectoralis contraction.²⁻⁵ Development of acellular dermal matrix and meshes, though, have addressed previous concerns of prepectoral implants.²⁻⁷ Prepectoral pockets are thus more widely used for postmastectomy reconstruction, with demonstrated lower pain, quicker recovery, and significantly lower rates of animation compared with submuscular placement (OR 0.02, 95% CI 0.00–0.25, $P = 0.02$).^{2,4,6,7} Additionally, although, breast animation occurring with submuscular and dual-plane pockets may be managed with fat grafting and Botox injections, conversion to the prepectoral plane is currently considered definitive treatment.²⁻⁷

A systematic review of 10 studies on breast animation found 100% resolution of animation after conversion to the prepectoral plane across 503 breasts.⁶ Other studies similarly demonstrate complete resolution of breast animation after conversion from submuscular and dual-plane to prepectoral implant pockets.^{2,4,5} Contour abnormality was the most frequently reported postoperative complication across the studies, and was treated with fat grafting, whereas infections and hematomas were infrequent.^{4,5} The Kim grading system allows for quantitative grading of breast animation severity based on nipple displacement (> or <2cm) and contour irregularity (> or <25%).⁸ Our patient had grade III (severe) animation preoperatively, and in contrast to the current literature, experienced recurrent animation at 3 months, albeit of milder severity (grade II).

There are currently no studies reporting animation deformity after prepectoral implant placement for breast augmentation or reconstruction. One case report described persistent animation in the patient after removal of a submuscular breast implant.⁹ Revision surgery revealed adhesions between the pectoralis and skin, with a remnant capsule between the pectoralis and deeper chest wall.⁹ Animation resolved after capsulectomy and suturing of the pectoralis to the chest wall.⁹ This suggests that poor

fixation of the pectoralis to the chest wall, such as from an intervening capsule, alongside adhesions between the muscle and skin may cause persistent animation after submuscular implant removal.⁹ Capsulectomy, however, is not routine in implant plane revisions and, therefore, does not fully explain persistent or recurrent animation,^{3,5,10} and our patient experienced recurrent animation despite capsulectomy and conversion to prepectoral plane. Inadequate release of the pectoralis and scar tissue may cause persistent rather than recurrent animation; however, we performed meticulous intraoperative dissection to release the pectoralis without dividing the muscle. There were no clinical signs of swelling and no seroma at her 1-week postoperative review that may have masked persisting animation, thus suggesting true recurrence.

In patients with submuscular implants, division of the inferomedial pectoralis fibers is associated with higher animation risk due to loss of countertraction against upward implant movement.⁸ Although it is possible that these inferomedial fibers were inadvertently divided in our patient, her recurrent animation remains unexplained, as the implant now overlies the pectoralis. Further, animation is typically limited to the implant and chest wall, while our patient had concomitant upwards anterior abdominal wall movement. A dynamic ultrasound and CT scan of the chest and upper abdomen performed with and without pectoralis contraction found no alteration in pectoralis and rectus abdominis configurations and no dynamic muscle bunching, and the contracting pectoralis moved separate to the implant. Curiously, our patient's breast animation occurred only while standing upright with no implant animation in the supine position. Thus, simple adhesions between the posterior aspect of the implant capsule and prepectoral fascia do not explain her symptoms. The cause of recurrent animation after prepectoral implant placement therefore remains unclear, and hence, optimal management remains to be defined. Surgical reexploration and revision was offered; however, the patient preferred nonoperative management.

In conclusion, we report an unusual case of recurrent breast animation after dual-plane to prepectoral implant pocket conversion. Although this did not produce any functional limitation, it compromised cosmesis and did not address the original indication for her revision surgery. It is, therefore, important that patients and clinicians are aware of the rare possibility of recurrent animation after conversion to prepectoral implant placement to enable informed decision-making. Additionally, further research into potential contributing factors would help guide optimal treatment.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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