

# The Laminated Nature of the Pectoralis Major Muscle and the Redefinition of the Inframammary Fold Clinical Implications in Aesthetic and Reconstructive Breast Surgery

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## KEYWORDS

- Pectoralis major muscle • Inframammary fold • Subpectoral augmentation • Breast augmentation
- Breast reconstruction • Acellular dermal matrix • Breast inflection points • Chest wall anatomy

## KEY POINTS

- The inframammary fold (IMF) is a critical landmark and aesthetic structure in breast surgery, yet it is poorly understood.
- The skin envelope is considered a separate entity from the chest wall; however, its surgical manipulation is not independent of chest wall anatomy.
- The pectoralis major muscle is a key structure in both cosmetic and reconstructive surgery, and its structure and performance are related to its inferior costal origins.
- A better understanding of the relationship of the IMF, pectoralis, and chest wall anatomy can offer improved outcomes in breast surgery.

## INTRODUCTION

The breast is appreciated aesthetically and clinically for its shape, projection, and volume. Multiple techniques have evolved over the years to modify, enhance, or recreate the breast mound. To this end surgical techniques have evolved to manipulate the breast skin envelope, soft tissues, and chest wall anatomy, with and without prosthetic devices. The pectoralis major specifically is altered for pocket dissection and implant coverage. Both the aesthetic and reconstructive surgeons are

intimately aware of its relationship to the chest wall and the breast soft tissues. Both are able to achieve outstanding outcomes; however, the authors present an alternative appreciation of the pectoralis and its relationship to the breast. The authors liken the comparison to the tale retold by John Saxe of the 6 blind wise men and the elephant (**Fig. 1**). Although Saxe claims the learned men were wrong, the authors propose to illustrate a broader perspective on the nature of the pectoralis.

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The Blind Men and the Elephant, John Godfrey Saxe (1816–87)

*It was six men of Indostan  
To learning much inclined,  
Who went to see the Elephant  
(Though all of them were blind),  
That each by observation  
Might satisfy his mind.*

*The First approached the Elephant,  
And happening to fall  
Against his broad and sturdy side,  
At once began to bawl:  
“God bless me! but the Elephant  
Is very like a WALL!”*

*The Second, feeling of the tusk,  
Cried, “Ho, what have we here,  
So very round and smooth and sharp?  
To me 'tis mighty clear  
This wonder of an Elephant  
Is very like a SPEAR!”*

*The Third approached the animal,  
And happening to take  
The squirming trunk within his hands,  
Thus boldly up and spake:  
“I see,” quoth he, “the Elephant  
Is very like a SNAKE!”*

*The Fourth reached out an eager hand,  
And felt about the knee  
“What most this wondrous beast is like  
Is mighty plain,” quoth he:  
“'Tis clear enough the Elephant  
Is very like a TREE!”*

*The Fifth, who chanced to touch the ear,  
Said: “E'en the blindest man  
Can tell what this resembles most;  
Deny the fact who can,  
This marvel of an Elephant  
Is very like a FAN!”*

*The Sixth no sooner had begun  
About the beast to grope,  
Than seizing on the swinging tail  
That fell within his scope,  
“I see,” quoth he, “the Elephant Is very like  
a ROPE!”*

*And so these men of Indostan  
Disputed loud and long,  
Each in his own opinion  
Exceeding stiff and strong,  
Though each was partly in the right,  
And all were in the wrong!*



**Fig. 1.** The blind men and the elephant. (From Holton MA, Curry CM. Holton-Curry readers, volume 4. Chicago: Rand McNally & Company; 1914.)

## REVIEW OF THE LITERATURE

The IMF is a critical visual marker for the breast, and its importance in both aesthetic and breast reconstruction surgery is the foundation of achieving acceptable results as emphasized by Carlson, the first of the wise men describing the IMF as an aesthetic structure.<sup>1</sup> Yet its structure and definition have been difficult to understand.<sup>2,3</sup> To compound this, the relationship of the IMF with chest wall anatomy is only casually understood. A broader appreciation of the IMF as it relates to the skin, muscle, and chest wall aids in obtaining improved outcomes. Observations from clinical and cadaveric dissection are described to broaden this appreciation.

In a cadaveric study by Maillard and Garey,<sup>4</sup> the IMF was approached from a subglandular approach with the breast soft tissues bluntly dissected off the chest wall until resistance was encountered. A crescent-shaped ligamentous band was identified stretching between the superficial surface of the pectoralis major muscle and the overlying skin. Bayati and Seckel<sup>5</sup> later identified the IMF as a ligamentous structure arising from the periosteum of the fifth rib medially and extending to the interspace between the fifth and sixth ribs laterally. The ligament inserts onto the deep dermis in the region of the inframammary skin fold. In this study, the IMF was approached from a subpectoral approach with the pectoralis bluntly dissected off the chest wall. After avulsion of the insertions of the pectoralis muscle off the fifth rib, the ligament they identified at the inframammary crease resisted further blunt dissection

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