

Clinical, Biomechanical and Anatomic Investigation of Colles' Fascia and Pubic Ramus Periosteum for Use During Medial Thighplasty

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Disclosure/Financial Support: None of the authors has a financial interest in any of the products, devices, or techniques mentioned in this manuscript.

INTRODUCTION: Medial thighplasty is a procedure where patients may attain superior mobility, hygiene, and cosmesis. Most surgeons utilize attachment of the superficial fascial system (SFS) of the thigh flap to Colles' fascia while others attach the SFS to the pubic ramus periosteum. Due to a high complication profile, we aim to elucidate the clinical, biomechanical, and anatomic qualities of the Colles' fascia versus pubic ramus periosteum.

MATERIALS AND METHODS: We performed a 17-year retrospective review documenting major and minor clinical complications, a biomechanical analysis of sutures placed in different tissue layers of the thigh, and a histologic analysis surrounding the ischiopubic ramus. Separate suture pull out strength testing was done on cadervic tissue using an Admet MTEST Quattro with #1 Vicryl suture and tissue grips at a displacement rate of 2.12mm/s. Simultaneous displacement and force was measured at regular intervals between the pubic symphysis and the ischial tuberosity in both the Colles fascia and in the deeper periosteal tissue layers of the thigh. A histologic analysis was performed at three points along the ischiopubic ramus using paraffin embedded large mount tissue sections stained with hemotoxylin, Eosin, and Gomori's Trichrome.

RESULTS: Thirty-nine patients underwent medial thighplasty with a 46.16% complication rate. Suture pull out force of the suspected superficial Colles fascia sites were on average 72.8% less than values from the deeper periosteum tissue. Anchor points in the Colles' fascia elongated 17.4% further prior to failure than those in the periosteum. There was noticeable variability between anchor points and across samples. The histologic sections suggest that Colles' fascia from the different regions of the ischiopubic ramus vary considerably both in continuity and collagen fiber content. The periosteal and muscular fascial layers were more continuous histologically with direct attachments into the pubis and ischium.

CONCLUSION: Anchoring of the SFS to the periosteum did not improve the complication profile when compared to the literature. Both the biomechanical and histologic analyses demonstrate that the Colles' fascia is highly variable in composition with coincident variability in tissue strength, which may account for the high complication profile of this procedure. Our results require further study to identify the optimal surgical technique for medial thighplasty.