

Evaluation of hyaluronan content in areas of densification compared to adjacent areas of fascia



Emmett J. Hughes DC MS¹, Kena McDermott BS HT², Matthew F. Funk DC³
University of Bridgeport School of Chiropractic



Background

Connective tissues between fascia layers are rich in **hyaluronan (HA)**, allowing normal gliding of fascial layers. Fascial densifications contain increased concentration of **HA** molecules, leading to aggregation of **HA** chains and altered HA consistency. Restricted fascial gliding, dysfunction and pain may follow. Centers of coordination (CC) are specific points where forces of muscle contraction converge in epimysial fascia to coordinate joint movement.

This study compared **HA** content at a densified CC to adjacent non-densified areas and looked for visible differences between CC and non-CC sites through histological staining techniques.

Methods

A CC in the tensor fasciae latae was identified on an embalmed human cadaver. A densification was identified at the CC by palpation before dissection. Non-densified muscle and fascia was dissected 2 cm away from the palpated density. Sectioned tissues were stained with Hematoxylin and Eosin. Serial sections were stained with Colloidal Iron, both treated and untreated with hyaluronidase, and Alcian Blue.

Results

Compared to similar adjacent tissue, increased **HA** was confirmed at the densified CC (Fig. 1). The concentration of positive staining decreased away from the densification site (Fig. 2). Dense blue staining was absent post-digestion with hyaluronidase (Fig. 3). This confirmed that the areas of positive staining material were **HA**. Sections from non-densified tissue demonstrated minimal **HA** content when compared to the palpated densifications (Fig. 4).

Conclusion

HA is demonstrated by both Colloidal Iron and Alcian Blue stains, confirmed by lack of staining after treatment with hyaluronidase.

This visual method indicated high concentration of HA at the CC that decreased away from the site.

1 Associate Professor of Basic and Clinical Sciences

2 4th year Chiropractic Student

3 Associate Professor of Clinical Sciences

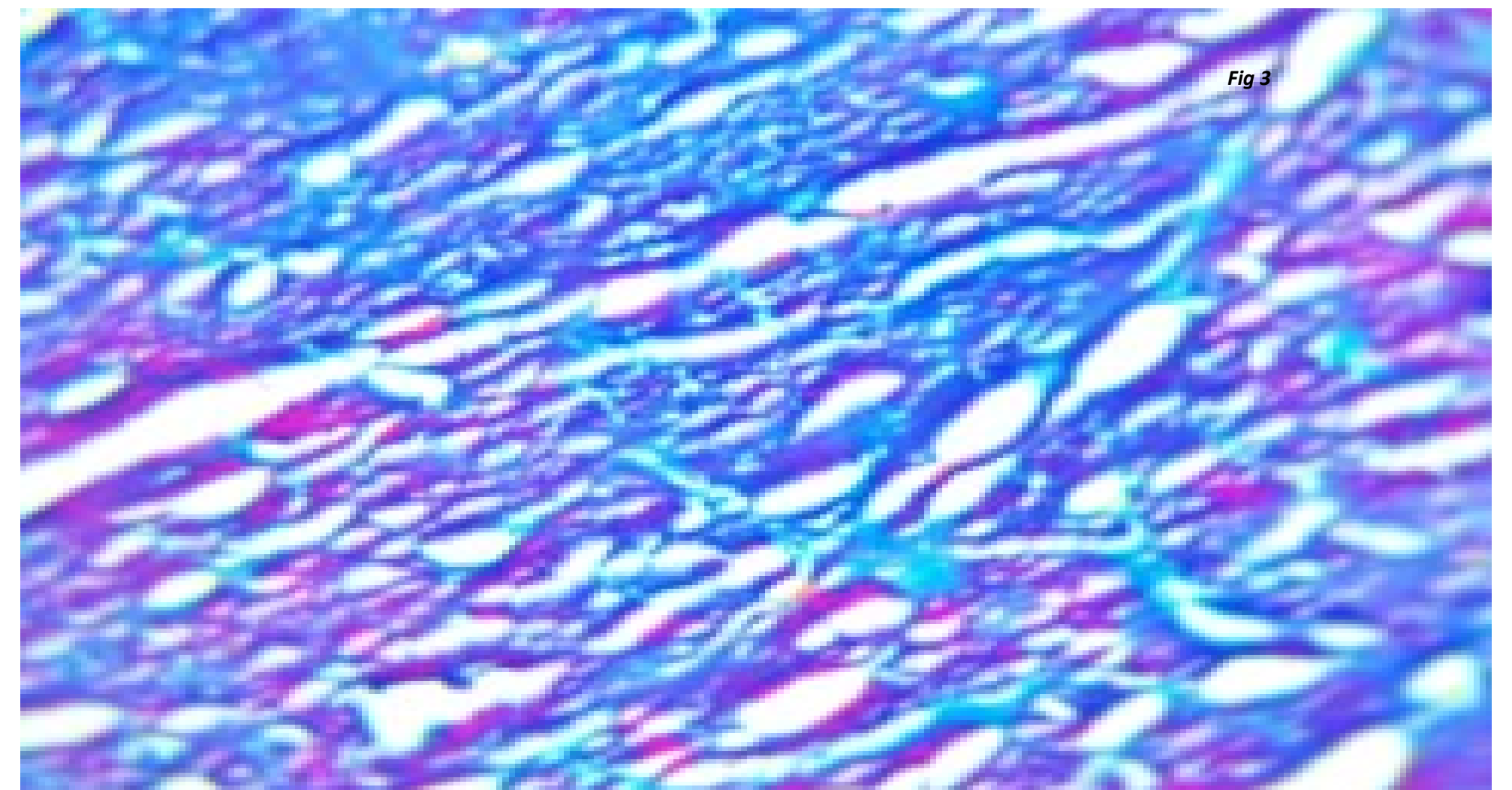


Fig 1: Densified CC with brilliant blue staining. Coll Fe stain, Untreated with hyaluronidase (40x).

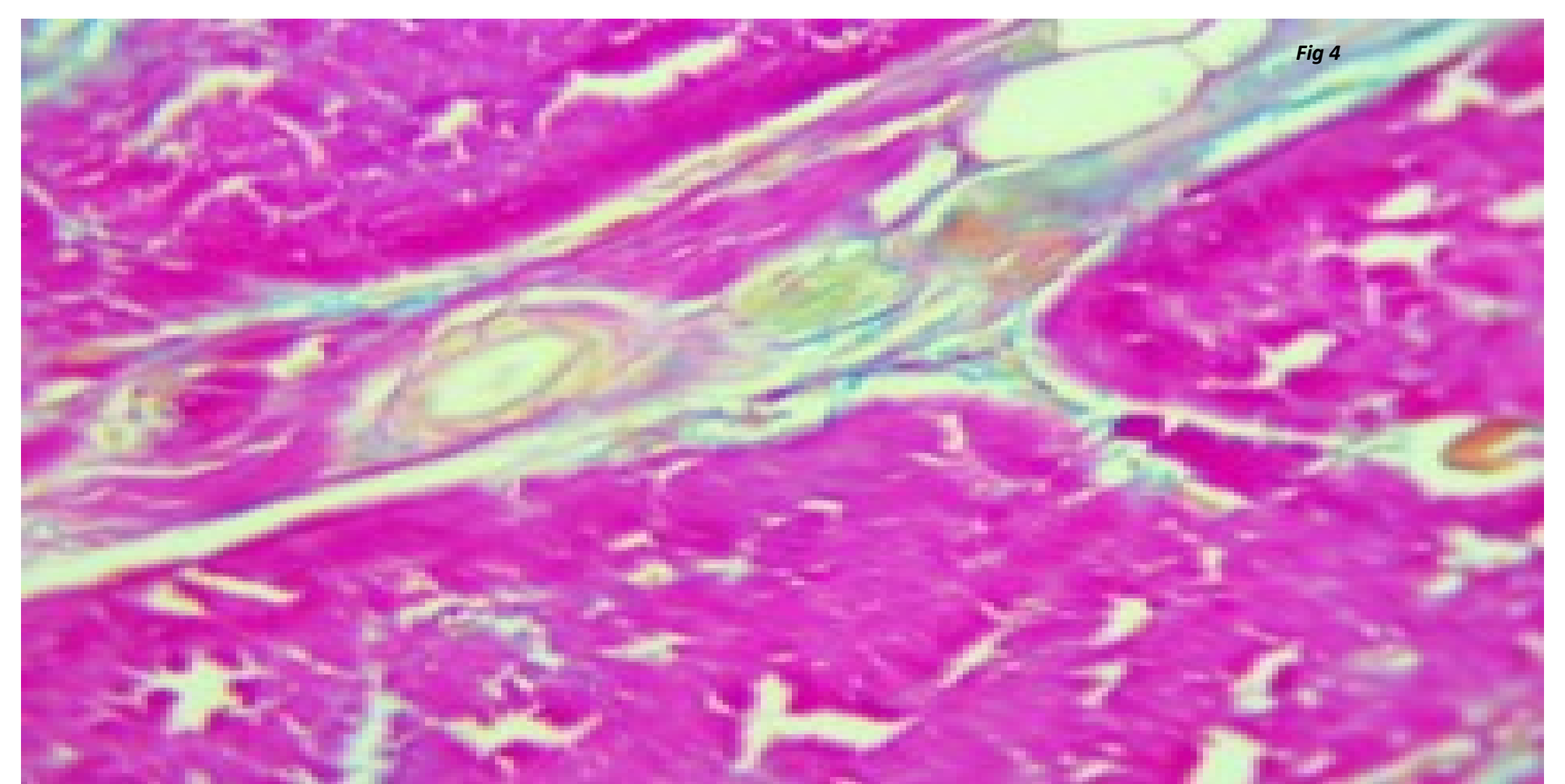


Fig. 2: Peripheral tissues furthest from the area of densification demonstrating minimal positive staining. Coll Fe stain, Untreated with hyaluronidase (40x).

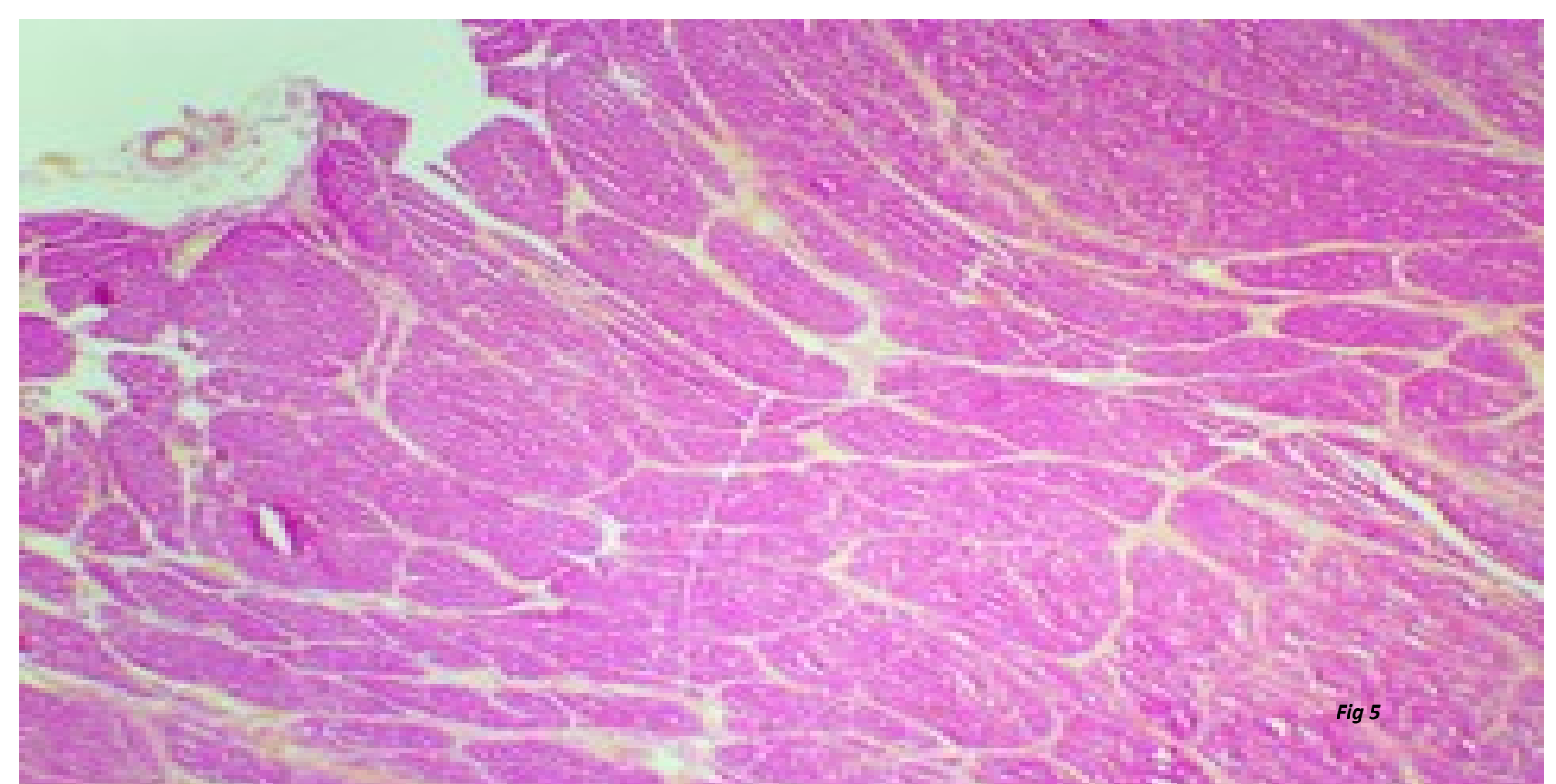


Fig. 3: Section from CC as in Fig. 1 that has been treated with hyaluronidase before staining with Coll Fe (4x). Absence of blue staining confirms that the positively stained substance in Fig. 1 has been digested by hyaluronidase, and is therefore, HA..

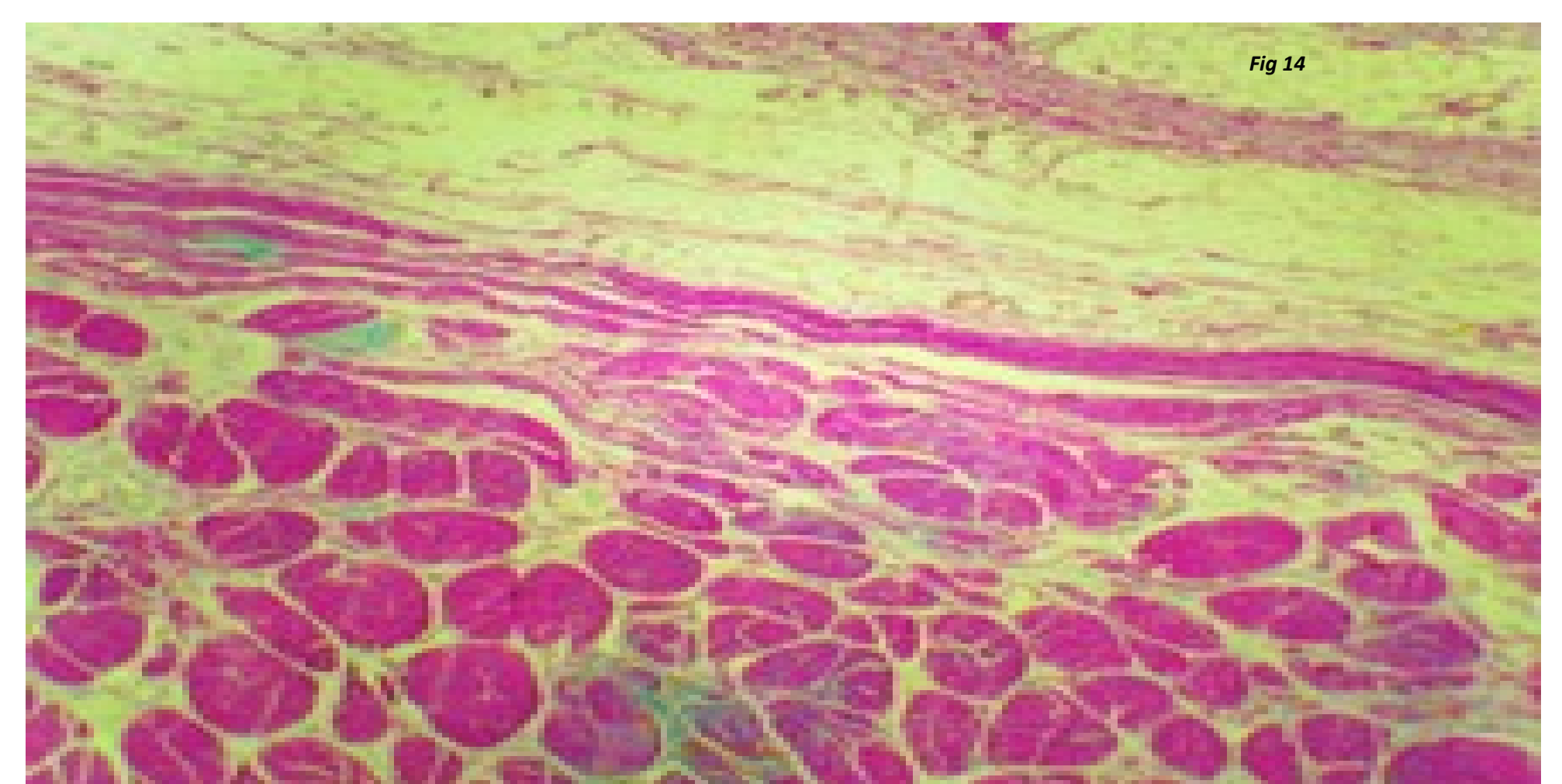


Fig. 4: Tissue distant from CC demonstrating minimal HA content in comparison to the palpated densifications in the CC. Coll Fe untreated (4x).