



## Hyaluroma: Description of a Novel Finding in Surgical Approaches to the Face

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### Abstract

**Introduction:** The aging process affects all layers of the face, necessitating facial rejuvenation techniques that address fine lines, skin laxity, and volume loss. Hyaluronic acid fillers have become integral in addressing these concerns, offering versatility and effectiveness.

However, complications can arise, including the newly described phenomenon termed “hyaluroma,” encountered during surgical facial approaches.

**Methods:** We conducted a retrospective observational study involving 30 female patients undergoing facelift procedures with a history of hyaluronic acid filling. Patients were evaluated intraoperatively for the presence of translucent slightly bluish nodules in deep subcutaneous planes, with histopathological confirmation of hyaluronic acid deposition.

**Results:** Translucent nodules consistent with hyaluroma were identified in three patients, confirming late adverse events of hyaluronic acid application. Hyaluroma represents an emerging complication associated with deep plane hyaluronic acid injections.

**Discussion:** Hyaluroma poses diagnostic challenges due to its subclinical presentation, necessitating heightened awareness among practitioners. Factors contributing to hyaluroma formation include injection technique and anatomical site. Preoperative imaging may aid in detection, guiding surgical planning and management.

**Conclusion:** Hyaluroma represents a novel complication of hyaluronic acid fillers, highlighting the importance of understanding anatomical variations and injection techniques. Further research is warranted to elucidate optimal management strategies and refine facial rejuvenation practices.

**Keywords:** Hyaluroma; Hyaluronic Acid Fillers; Facial Rejuvenation; Facelift Surgery; Adverse Events

## Introduction

The face comprises a complex layered structure consisting of skin, subcutaneous fat, muscles, deep fat compartments, retaining ligaments, and bone structure. All layers are affected by the aging process, and facial aging treatment should involve techniques that correct fine lines, skin laxity, and restore facial volume loss. The use of hyaluronic acid fillers has revolutionized the management of age-related changes in various layers of the face, and currently, there are several subtypes of hyaluronic acid fillers varying in characteristics to be used in each specific anatomical layer of the face [1]. Hyaluronic acid filler is the most widely used type of filler in the current aesthetic market [2]. Biochemically, hyaluronic acid is a member of the polysaccharide glycosaminoglycan family, composed of repeated units of N-acetyl-glucosamine and B-glucuronic acid disaccharides. Hyaluronic acid stabilizes intercellular components of the dermis, used to promote filling and structural support. Unlike other fillers, hyaluronic acid has the advantage of being an immunologically inert molecule due to the absence of epitope proteins [3]. It also has the ability to interact with tissue receptors, acting not only to fill but primarily on tissue biomodulation [4]. Although dermal fillers are generally considered safe, they are not exempt from complications or adverse events. The true incidence of adverse events of hyaluronic acid fillers is difficult to establish due to the lack of universal reporting, and many minor events are not brought to the attention of the physician [5]. Complications associated with the use of hyaluronic acid fillers are divided into recent complications (occurring directly after filling, or some days or weeks after the procedure) and late complications (occurring months or years after the procedure) [6]. In the field of plastic surgery, facelift surgery has also increased in frequency, becoming a predictable, safe, and extremely effective surgery that brings natural and long-lasting results. Surgical facelift techniques have evolved to address skin flaps, platysma, manipulations of the superficial musculoaponeurotic system (SMAS), and various deep plane techniques involving both skin and SMAS as a single composite flap [7]. Therefore, in the manipulation of the various layers of the face during facelift surgery, we encountered a new finding called hyaluroma. Herein, we describe the finding of a probable adverse event of hyaluronic acid fillers encountered in surgical facial approaches: hyaluroma.

## Materials and Methods

Retrospective observational study with 30 female patients over 40 years of age who underwent facelift procedures and had a history of hyaluronic acid filling up to two years before surgery. Patients were treated from January to December 2021 in a private clinic in São Paulo, Brazil. Patients who underwent facial filling with a material other than hyaluronic acid or who had facial filling more than 2 years before the surgical procedure were excluded from the study. Patients were evaluated at the time of surgical procedure for the presence of translucent slightly bluish nodules found in deep subcutaneous planes. In patients where a nodule with these characteristics was found during tissue dissection, hyaluronidase was applied intraoperatively to confirm the etiology of the nodule.

## Results

We found the presence of translucent slightly bluish nodules in deep subcutaneous planes in three patients undergoing facelift procedures (Figure 1) [8]. After the application of hyaluronidase in all patients, the nodule was completely dissolved, confirming it to be of hyaluronic acid filler origin. We performed histopathological analysis of three fragments found in the subcutaneous tissue of one of the patients, all confirming the diagnosis of hyaluronic acid deposition in the hypodermis, without local inflammatory reaction. Thus, we termed this new surgical finding as hyaluroma, as it represents a late adverse event of hyaluronic acid application for facial rejuvenation.



**Figure 1:** Hyaluroma: Presence of two translucent nodules found during facial dissection during facelift surgery that were completely dissolved with hyaluronidase.

## Discussion

As the use of injectable hyaluronic acid grows, more complications are encountered. Among the non-vascular complications of hyaluronic acid, the most frequent complication is nodule formation. Nodules can be recent or late after hyaluronic acid application and are usually associated with the technique used [9]. The incidence of hyaluronic acid nodules is estimated at 0.02% and is associated with visible or palpable nodules or “masses” in the area treated with injectable hyaluronic acid [3,10]. Due to the characteristics of the hyaluronic acid molecule and its immunologically inert nature, the presence of non-infectious and non-inflammatory nodules is associated with large volume bolus application in a single location, overcorrection, superficial application of the product, or injection of the filler into a muscle [3,11]. In this work, we describe hyaluroma, a hyaluronic acid nodule accidentally found in surgical facial approaches that, unlike nodules reported in the literature, do not present clinical evidence as they are neither visible nor palpable. Therefore, we associate the presence of hyaluroma with the application of hyaluronic acid in deeper planes. The delivery of hyaluronic acid in deep planes of the face has recently increased in facial rejuvenation treatment, aiming to treat not only the skin but also other facial structures, seeking to restore facial volume loss. Ultrasound imaging has been utilized for the diagnosis of palpable nodules resulting from dermal filler administration [12]. Nodules are visualized as usually rounded anechoic regions with the same outline. Magnetic resonance imaging has been shown to assess the anatomical location of the filler and distinguish between filler accumulation, fibrosis, and granuloma [13]. Therefore, we believe that performing preoperative imaging in patients with a history of facial filling would be interesting to assist the surgeon in predicting the presence of hyaluroma and its likely location. The use of facial filling techniques in deeper planes to treat age-related changes in the various skin layers has currently increased. For this, it is fundamental to understand how aging occurs in each of the different anatomical layers of the face and also to know the characteristics and rheological properties of the different types of hyaluronic acid fillers to place the correct filler in the right layer of the face to obtain a more refined result with minimal adverse effects [1].

## Conclusion

Hyaluroma, accumulation of hyaluronic acid in deep planes of the face, encountered during tissue dissection in facelift surgery,

is described in this work as a novel finding in surgical facial approaches. We believe its presence is associated with the use of filling techniques that aim to reposition anatomical alterations of the facial layers through the application of hyaluronic acid filling techniques in bolus and in deeper planes (supraperiosteal, deep subcutaneous), justifying the emergence of hyaluromas, as in these planes the interaction of hyaluronic acid with its tissue receptors and biomodulation effect may be reduced.

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