FACTA ANATOMICA

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UNIFIED ANATOMICAL EXPLANATION OF EARLOBE CREASES

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INTRODUCTION

Globally, cardiovascular disease and its associated metabolic disorders are the leading cause of mortality . Physical examination signs remain credible diagnostic indicators of cardiovascular and metabolic disorders.

Three types of ear creases have been described in the medical literature with evidence of their associations to various cardiometabolic disorders, including heart disease, stroke, and type 2 diabetes.(Figure 1).

1. ***Diagonal earlobe crease (DELC),*** also known as Frank's sign[1].
2. Vertical creases anterior to the tragus, a single crease is termed anterior tragal line whereas multiple creases are termed ***Preauricular vertical crease.***
3. Two creases located at the upper pole of the ear helix are known as the ***Paired ear creases of the helix (PECH).***

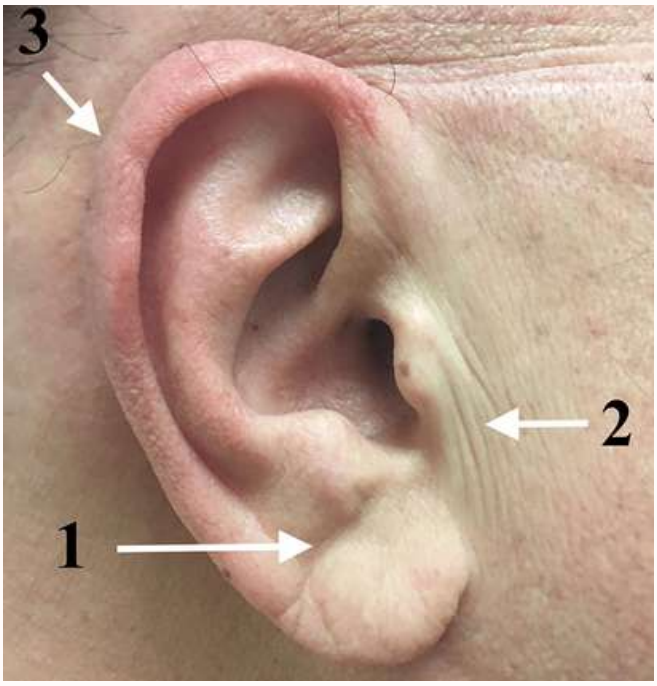

FIGURE 1:
1) Diagonal earlobe crease.
2) Preauricular vertical crease.
3) Crease of the helix

THREE TYPES OF EAR CREASES

It is essential to make a clear distinction between skin creases and skin folds. Skin creases are permanent and irreversible lines in the skin that develop secondary to prolonged traction by an underlying attachment to the deep structures whereas skin folds are created by skin redundancy and are not necessarily permanent [2].

AN ANATOMICAL EXPLANATION OF THE MECHANISM OF DEVELOPMENT OF EAR CREASES AND THE LIKELY CAUSE FOR CARDIOMETABOLIC DISORDERS

- Obesity, particularly, visceral obesity is an established risk factor for cardiovascular and metabolic disorders with a growing body of research demonstrating a potential causal association independent of total body weight. Visceral fat deposits include intra- and inter-organ fat inside the abdominal and thoracic cavities in addition to the head.

Despite being anatomically separate, the buccal fat pad (BFP) of the cheeks and abdominal visceral adipose tissue appear to be metabolically and histologically identical.

- The size of the BFP was strongly corresponding with the size of abdominal visceral fat even in normal-weight individuals [3].In overweight adults, the size of the BFP, obtained from ultrasound measurements, was found to be significantly correlated with all anthropometric parameters, including total body weight and body mass index (BMI).

The **BFP** is a deep encapsulated biconvex mass of adipose tissue located between the masticatory muscles within the lateral aspect of the face.[fig 2]The anatomy of the facial fat compartments and BFP is referred to as the visceral fat of the face [5].

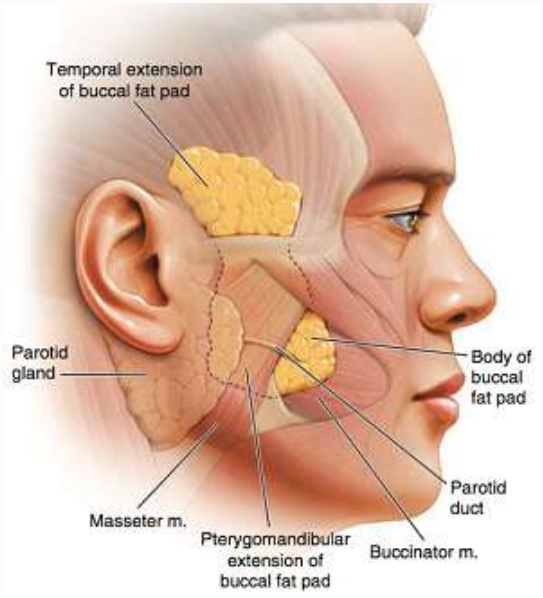

FIGURE 2: Buccal fat pad

The BFP is referred to as the visceral fat of the face. Lateral to the BFP lies the parotid gland which is attached by the tympanoparotid fascia as a band running from the parotid gland to the intertragal incisura of the auricular cartilage to the depth of the tympanomastoid fissure of the skull [4]. It was also demonstrated that ***Lore's fascia***, a retaining ligament which is strong and fixate facial soft tissues to bony landmarks[5]. [figure 3]. Due to its significant strength, the ligament is utilized as a hook during facelift surgery.

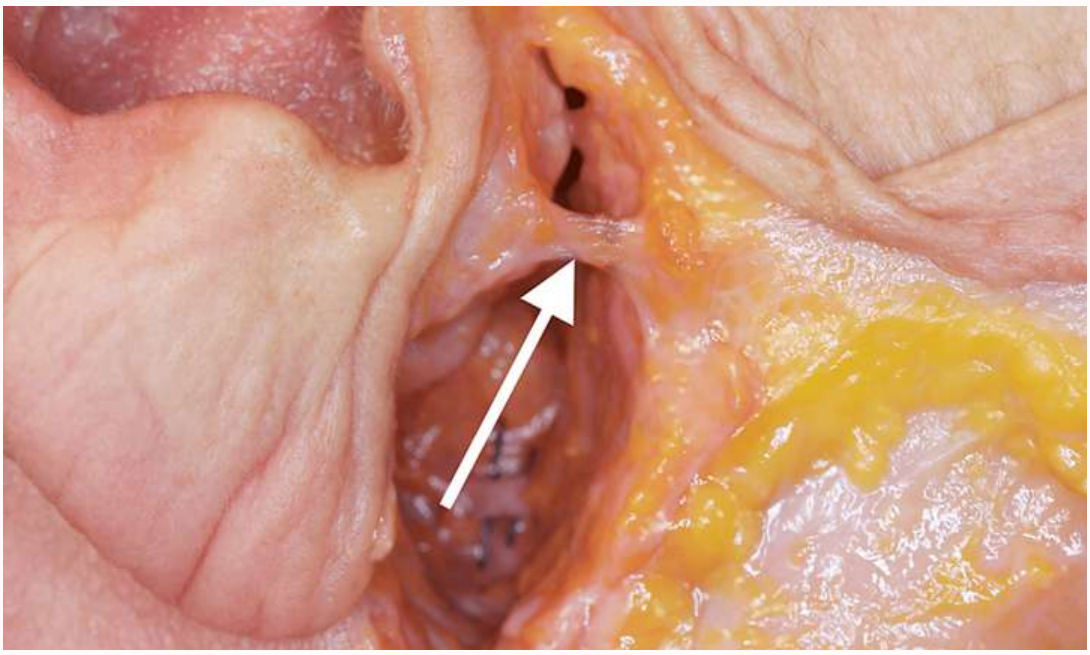

FIGURE 3: Cadaver dissection demonstrating the attachment of Loré's fascia into the intertragal incisura of the auricle (Courtesy: Dr. Justin X. O'Brien).

Frank's Sign

In visceral obesity, the size of deep cheek fat of the BFP increases, anchoring over its fixed attachment of Lore's ligament to the skull. This results in skin redundancy of the cheek that causes pleating of the skin in front of the ear creating the anterior tragal line and preauricular vertical creases. The term preauricular creases are more likely to be skin folds rather than true permanent creases. Traction at the base of the earlobe's attachment and folding of the earlobe lead to creasing. Over years of traction, the histopathological changes are set permanently, creating the DELC known as Frank's sign[1].

The Frank sign was first established in 1973 by American pulmonologist Sanders T. Frank to describe a unilateral or bilateral diagonal fold of skin between the tragus and outer edge of the earlobe, which is also called a Diagonal earlobe crease (DELC) [1].

Gradation may be based on the bilateral occurrence and/or degree of the earlobe crease (Fig. 4).

- Grade 1 is a slight wrinkling of the skin around the earlobe.
- Grade 2a involves a superficial skin fold that partially covers the earlobe at least halfway.
- grade 2b involves a superficial skin fold that covers the earlobe completely.
- Grade 3 involves a deep skin fold that covers the entire earlobe.[1]

FIGURE 4: DELC grading

SPECIAL CONSIDERATIONS

Earlobe creases are more prevalent in men than women, however, prevalence is increased among postmenopausal women as compared to premenopausal. In women, facial fat distribution changes following the menopausal transition mimicking that of men [6]. The higher prevalence of DELC in men compared with women could be explained by the prevalence of central obesity with its associated facial obesity in men [6].

Surgical excision of bilateral BFP is termed “Bichectomy” and has been gaining popularity worldwide for aesthetic and reconstructive purposes. Earlobe creasing is dependent on earlobe shape, therefore, DELC is more prevalent in free lobes than in attached lobes.[7]

Ear creases could be viewed as signs of either a current or past history of long-standing visceral facial obesity as ear creases are irreversible skin creases whereas visceral obesity and its associated cardiometabolic disorders are potentially reversible.

The term preauricular creases is a misnomer, and since they are created by skin redundancy they fit the definition of “folds” rather than “creases” as they are not fixed (non-permanent) and created by skin pleating and redundancy [8].

CONCLUSION

The facial visceral obesity, particularly in the sideburn area of the cheek, is the common driver that explains the link between all types of ear creases and cardiometabolic disorders. It is hypothesized that the presence of auricular creases could be evidence of long-standing facial visceral obesity.

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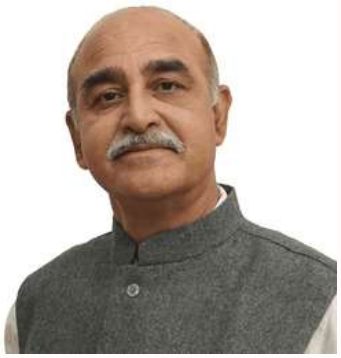

MESSAGE FROM EXECUTIVE DIRECTOR

PROF.DR. (COL.) CDS KATOCH, AIIMS RAJKOT

I heartily congratulate the Department of Anatomy for bringing this informative newsletter on unified anatomical explanation of earlobe creases. My best wishes to the entire team.

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