

# Uncovering the Secret of Diagonal Ear Lobe Crease

Diptiranjani Bisoyi,<sup>1</sup> Shiba Ranjan Kar,<sup>1</sup> Sudeepta Nayak,<sup>1</sup> Smruti Ranjan Das,<sup>1</sup>  
Chandan Kumar Sahoo<sup>1</sup>

<sup>1</sup>SCB Medical College and Hospital, Cuttack, Odisha

## Abstract

Frank's sign is a diagonal crease of the earlobe that runs from the tragus across the lobule to the posterior margin of the auricle. Commonly referred to as the diagonal earlobe crease (DELC), it has been considered a potential marker of diabetes, cardiovascular disease, and other metabolic conditions. Since both the heart and the earlobe are supplied by end arteries, it was once believed that DELC and heart disease might develop concurrently, as collateral circulation is limited when vascular damage occurs. Some studies have also suggested an association with aging and polycystic ovarian syndrome. Early diagnosis is essential in order to provide effective therapy, reduce mortality, and improve quality of life. However, further research is required to better establish the diagnostic significance of Frank's sign and its clinical applications. Here, we report five cases of DELC with varied associated disorders.

**Keywords:** Cardiovascular disease, Diagonal Ear Lobe Crease, Frank's Sign

Dear Editor

Diagonal earlobe crease (DELC) is a groove that extends from the tragus, across the earlobe to the edge of it. It is called Frank's Sign, described by ST Frank, who observed this crease in 20 patients with angina in 1973.<sup>1</sup> It has been hypothesised that Frank's sign is indicative of cardiovascular diseases like coronary artery (CAD) and peripheral vascular disease, as well as cerebrovascular disease and/or diabetes.<sup>2</sup> It may be due to microvascular disease in the middle ear lobe, which is an end-artery territory area. DELC acts as an objective visible marker of old age, in addition to corneal arcus, grey hair, xanthelasma and facial wrinkles.<sup>3</sup> When Histopathologically, the arterial vessel at the base of the earlobe had myoelastofibrosis. It may be vulnerable to long-term hypoxia-reoxygenation damage from atherosclerosis because, it is a line of prenatal structure merging. Additionally, it was found that individuals with DELC had higher cardiac weight.<sup>4</sup> This data supports the notion that DELC is a primary cause of atherosclerosis and not an accidental consequence of it.

The paired ear creases of the helix (PECH) and pre-auricular vertical creases are two other creases that resemble DELC. PECH are the wrinkles present over upper pole of the ear helix, pre-auricular vertical wrinkles are a group of creases, while the anterior tragal line is a single crease.<sup>4</sup> According to some authors, there is a relationship between the high prevalence of

DELC and cognitive decline in older adults.<sup>3</sup> According to published research, young women with DELC should be evaluated for polycystic ovarian disease (PCOD). The suggested classification of DELC with and without severity of cardiovascular illness is shown in summary in Tables 1.<sup>5</sup>

A 68-year-old woman, diagnosed with tinea cruris, was noted to have a diagonal earlobe crease (DELC) on clinical examination [Figure 1, Case 1]. She was of thin build, and all other clinical parameters were within normal limits. Although coronary artery disease (CAD) screening tests such as an exercise stress test could not be performed, an electrocardiogram (ECG) was obtained and was unremarkable. Similarly, four additional patients presenting to our dermatology department with various dermatological conditions, unrelated to DELC, were also observed to have earlobe creases. The details of these cases are summarized in Table 2 and illustrated in Figure 1.

The article highlights that the presence of diagonal earlobe crease (DELC) is not invariably associated with coronary artery disease (CAD) or other comorbidities. Nonetheless, large-scale prospective studies are warranted to establish its predictive validity. Notably,

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## Corresponding Author:

Dr. Diptiranjani Bisoyi, Associate Professor  
SCB Medical College and Hospital,  
Cuttack, Odisha

ORCID ID: <https://orcid.org/0000-0002-6970-8408>

Email: [diptiranjaniabisoyi@gmail.com](mailto:diptiranjaniabisoyi@gmail.com)

several experts have reported an association between DELC and increased risk of CAD, even in the absence of conventional risk factors such as smoking, aging, diabetes, and hypertension. Given that DELC is

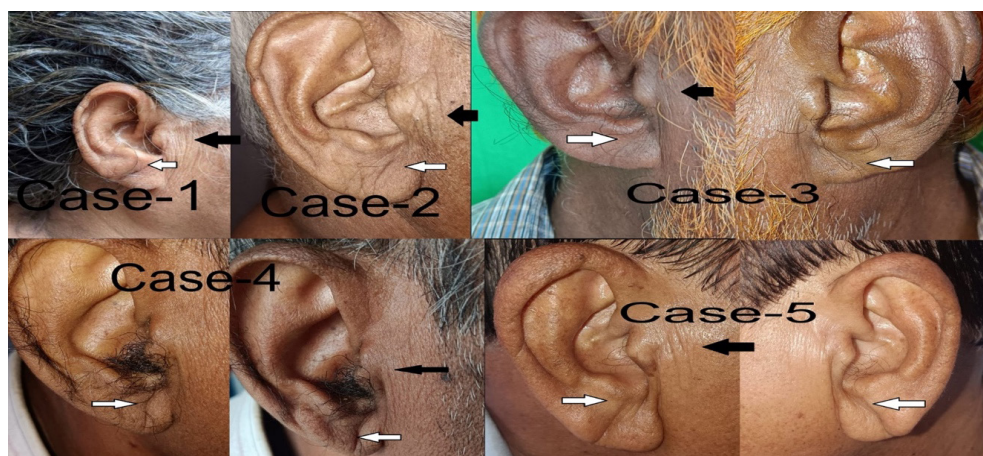
simple to detect, entirely non-invasive, and cost-free, its inclusion as part of routine physical examination may serve as a valuable adjunct to comprehensive cardiovascular risk assessment.

**Table 1:- Classification of DELC**

Without severity of cardiovascular disease		With severity of cardiovascular disease <sup>5</sup>	
Grade	Clinical Features	Unilateral incomplete extension	Least severe
Grade 1	Wrinkling of ear lobe	Unilateral complete extension	Moderate severity
Grade 2a	Superficial crease (floor of sulcus visible)	Bilateral complete	Most severe
Grade 2b	Crease more than 50% across earlobe		
Grade 3	Deep cleft across whole earlobe (floor of sulcus not visible)		

**Table:- 2 Details of all five cases of DELC**

No	Age & Sex	Skin condition	Cardiovascular disease	Others disorder	Investigation
1	68/F	Tinea	Not present	Not present	BP: Normal ECG: Normal
2	70/M	Eczema	History of Heart surgery	Hypertension	BP=160/90 ECG: Normal
3	65/M	Tinea	Not present	Hypertension and Diabetes	BP=180/100 ECG: Normal
4	68/M	Lichen simplex Chronicus	Coronary artery Blockage present	Diabetes	BP=220/100 ECG- ST depression, flattening of T waves
5	59/M	Tinea	Not present	Diabetes	BP=130/80, ECG-Normal



**Figure-1:** White arrows show diagonal ear lobe crease (DELC) in all cases, black arrows show anterior tragal lines and star shows paired ear crease of the helix( PECH)

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