

Diagonal Ear Lobe Crease^{1,2}

Narrative Section

HISTORICAL VIGNETTE - When Dr. Sanders T. Frank, M.D., published his observation of 20 patients with a “positive ear-lobe sign,” he summarized personal observations that this aural finding was “associated with premature cardiovascular disease.” The sign of the diagonal ear lobe crease would go on to bear his name as “Frank’s Sign,” indicating early heart disease. Prospective early investigations soon supported this physical exam finding as an independent risk factor for cardiac disease. Retrospective queries of the historical record seemed to support this finding. In marble-carved busts of the Roman Emperor Hadrian, a diagonal ear lobe crease is clearly represented. When he died in the year 138 at age 61 years old, records from the time suggested heart failure.



CONTEXT AND USEFULNESS - Like many risk factors for atherosclerosis, the diagonal ear lobe crease [DELC] can signal to the aware clinician high-risk patients who might have occult coronary artery disease. Along with the presence of hyperlipidemia, diabetes, hypertension, or tobacco use, the diagonal ear lobe crease can help focus further cardiac work up.

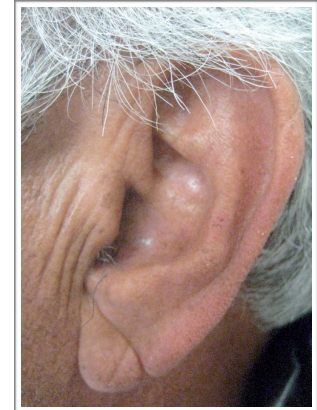
¹ Chi J *et. al.* “The Five Minute Moment.” *Am J Med.* **2016 Aug**; 129 (8): 792-795.

² Xuwei H *et. al.* “Ear Lobe Crease and Coronary Artery Disease” *Medicine.* **2015 Jul**; 94 (26): 1-7.

Physical Manuever

Model Proper (And Improper)

Technique - As the name of the sign implies, locate the ear lobe of the patient and look for a diagonal ear lobe crease [DELC] that extends from the inferior margin of the tragus to outer ear lobe margin. (Some investigators have defined the crease as traversing the entire distance, while others look for at least one-third of that distance.) The finding need not be bilateral to confer increased risk for patients. A discontinuous wrinkle or a fold that does not extend outward from the tragus is not considered a positive Frank’s Sign.



INTERPRETATION³ - Dr. Frank’s 1973 description in the *New England Journal of Medicine* represented the first publication describing this aural finding as an independent risk factor for cardiac disease. Subsequent studies have also linked the DELC to peripheral vascular disease and cerebrovascular disease. A summary of the data indicates that the presence of this finding is a modest risk factor (especially in patients less than 60 years old) with a LR = 2.3. The cause of the DELC remains elusive. However, researchers postulate—and studies support—the role of free radical oxidative stress as it relates to shortened telomeres (prematurely aging cells) and activating metalloproteinases (degrading type 1 collagen in ear lobes and arteries).

CAVEAT AND COMMON ERRORS - It is important to emphasize that as an independent risk factor, the presence of the ear lobe crease (like the eye’s *arcus senilis*, LR = 3.0) modestly increases the likelihood of coronary disease, even more when combined with other risk factors. The folds of elderly or weathered skin can be mistaken for the DELC, but these findings are often discontinuous. Those non-significant creases point toward the angle of the mandible, not away from it.

³ Friedlander A *et. al.* *Med Oral Patol Oral Cir Bucal.* **2012 Jan**; 1 (17): 153-159.