

tear passage. Steffan⁶ also describes a patient who had a second punctum a line below and to the right of the normal one; it was uncertain whether it opened into the sac or to the other canaliculus.

Lang and Treacher Collins,⁷ as well as others, refer to another anomaly of the canaliculi in their absence being taken by a groove in the lid margin. In my opinion, this may materially assist in explanation of the two cases which I have presented before you. At about the sixth week of foetal life in the human, according to Ryder,⁸ the first evidence of the lacrimal channel is manifested in the form of what has been termed the lacrimo-nasal groove. This extends from the eye to the outer border of the nasal opening, following a line, if represented in the adult, from the inner canthus to a point on the outer posterior margin of the nostril, next to the upper lip, just within the ala nasi, where it joins the cheek. This line in the adult lies approximately parallel with the tear or nasal duct. The lacrimo-nasal groove is then an involution of the ectoderm, and a thickening of the underside of the epidermis along this groove subsequently constitutes what we later understand as the nasal duct. This thickening forms a solid ridge, which then separates, except at each end, as a solid cord and acquires a lumen or channel, so as to become a canal of epidermal or ectodermal origin. The condition of congenital stricture of the duct may thus be explained to the non-development of the primary lumen in this foetal structure.

At the inner canthus the upper end of the originally solid cord expands, preliminary to dividing into two small branches, which constitute the lacrymal canaliculi, ending in what has been accepted as the puncta. Should involution of the ectoderm or epiderm not be complete at any point besides the natural end of the lumen constituting the punctum, this accessory opening, in my opinion, should be accepted as a congenital fistula, or, as what I prefer in this instance to term, a foetal cleft. Halben⁹ has shown the puncta lacrimalia to consist of circular as well as longitudinal fibres of the orbicularis, with a large element of elastic tissue cells. Until histological evidence is produced showing the tissue about one of these accessory openings to be of like structure, it is reasonable to conclude that longitudinal fibres only with a lining of several layers of stratified epithelium as found throughout the canalicula, would constitute the histological structure at this particular point. Consequently, the openings which I have attempted to describe should be considered not as puncta, as we understand them morphologically, but as clefts due to a non-development of the foetal lacrimo-nasal groove.