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The Golden Ratio Optimizes Cardiomelic Form and Function

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Abstract:

Both cardiac structure and hand proportion have been linked with the Fibonacci Series and the associated Golden Ratio - the number 1.618 that has been postulated to be related to functional optimization. In this paper, evidence supporting the relation of the Golden Ratio to the hand and heart is presented. It is known that upper limb malformations are the commonest skeletal abnormalities in patients with congenital heart disease. Embryological studies on hand-heart syndromes have provided evidence for a cardiomelic developmental field, which is supported by candidate genes involved in patterning of the hand and heart. Precise molecular interactions govern a certain optimal model of cardiomelic development, for which the underlying physical rule remains unknown. It is hypothesized that the Golden Ratio may represent the mathematical basis for hand-heart development so as to achieve optimal form and function. Deregulation of this underlying patterning law may manifest as variation in hand-heart structure away from that as would be determined by the Golden Ratio. Altered hand proportion in turn may be of predictive value for cardiovascular defects and dysfunction.

Keywords:

Holt-Oram Syndrome ، Golden Ratio ، Hand-heart ، Upper limb-Cardiovascular Syndromes

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