

**AORTIC VALVE MORPHOLOGY STUDY BY NONPARAMETRIC PERMUTATION TESTS**

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Most of the traditional inferential approaches for the statistical analysis of shape involve methods based on superimposition or on interlandmark distances. Since all these methods are based on strong assumptions, they may lose power when the number of landmarks exceeds the number of cases. We introduce a NonParametric Combination (NPC) approach to shape analysis. The NPC methodology is a conditional testing procedure that, under very mild and reasonable conditions, is found to be consistent, unbiased and extendible to unconditional or population inferences because of the permutation test similarity and conditional unbiasedness properties. This is a great advantage since we can overcome the problem of low sample sizes, that is recurrent in real applications. Along with a power simulation study, a case study on aortic valve morphology is also presented.