

# A Quick Look at Ventricular Septal Defect Classification

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## Introduction

I have read the well constructed review manuscript from the Authors Zeynep Eyileten, Adnan Uysalel with the title ‘Isolated ventricular septal defect in infants ‘ published EJCM 2017;5(2):27-33 with great pleasure. There are two main classifications described by Richard Van Praagh and by Robert Anderson. I want to give information about the main differences between the classifications of these two cardiac morphologists.

**Key words:** Ventricular Septal Defect, infants, classifications of cardiac morphologists.

Defects between the ventricles are the commonest congenital cardiac malformations. As yet, however, there is no consensus as to how they can best be described and categorized. Although most of the cardiac structure have been extensively addressed, significant gaps continue to exist between the descriptions provided by morphologists and by those working in the clinical setting such as the cardiologists and cardiac surgeons.

Although there are several definitions depending on the localisation and the diamention of the VSD’s the two modern anatomical descriptions were made by **Richard Van Praagh** and **Robert Anderson**.

**Van Praagh** classify the ventricular septal defects as:

- **Atrioventricular Canal**
- **Muscular**
- **Membranous**
- **Conoventricular**
- **Conal types.**

In **atrioventricular canal type** the VSD is located in the atrioventricular canal portion of the interventricular septum, under the tricuspid valve, and confined by the tricuspid annulus. This can occur with or without a Common AV Canal.

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**Muscular** VSDs are localised within the anterior, mid-ventricular, posterior or apical portion of the ventricular septum.

**Membranous** defects are usually small defects localised at the membranous septum.

**Conoventricular** VSD occurs due to hypoplastic or malaligned conal septum and is bordered by conal septum and the septal band. If there is membranous septal involvement, it is described as paramembranous or juxtamembranous. According to Van Praagh as 'peri-' means around and the defect doesn't surround the membranous septum the name perimembranous is incorrect.

**There are 4 subtypes:**

- **Hypoplastic conal septum:** The conal septum is hypoplastic, resulting in a large subaortic VSD, localized between the conal septum's inferior rim and the normally located septal band.
- **Hypoplastic and Anterosuperiorly Malaligned Conoventricular VSD:** The conal septum is hypoplastic and displaced at an antero-superior direction leading to the hypoplasia of the pulmonary outflow tract (e.g. TOF)
- **Hypoplastic and Posteroinferiorly Malaligned Conoventricular VSD:** The conal septum is hypoplastic and displaced posteroinferiorly creating subaortic stenosis (e.g. IAA with subaortic stenosis)
- **Right Laterally Malaligned Conoventricular VSD:** The conal septum is displaced to the right (e.g. DORV Tausig-Bing Type).

**Conal** VSD is located within the conal septum. Aortic and pulmonary valves are at the superior aspect of the defect. The remainder of the ventricular septal defect rim is bordered by the conal septal muscle.

**Anderson** classify the ventricular septal defects as:

- **Perimembranous**
- **Muscular**
- **Doubly Committed Juxtaarterial**

**Perimembranous** defects bordered by the area of continuity between one or both AV valves and the arterial valve

**There are 4 subtypes:**

- **Inlet:** The defect mainly opens into the right ventricular inlet, separating it from the left ventricular outflow tract.
- **Outlet:** The defect opens mainly into the right ventricular outlet.
- **Central (Previously termed as Confluent):** The defect is so large that the left ventricular shunting extends to all parts of the right ventricle.
- **With overriding Tricuspid Valve:** The defect is due to malalignment of the atrial and ventricular septums, such that the tricuspid valve overrides the interventricular septum.

**Muscular** ventricular defects are completely surrounded by muscular tissue.

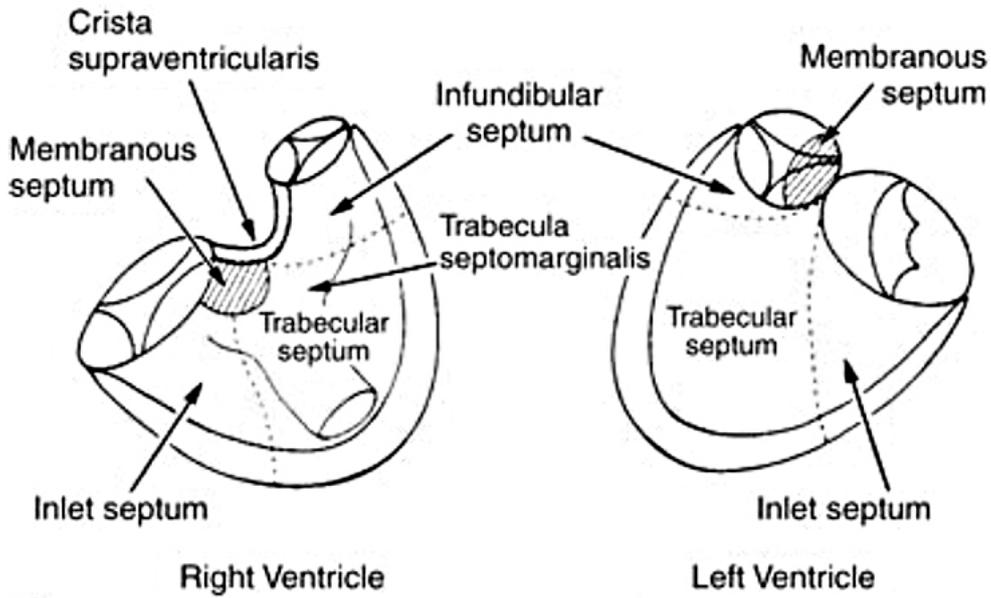
**There are 3 subtypes:**

- **Inlet:** The defect mainly opens into the right ventricular inlet.
- **Outlet:** The defect mainly opens into the right ventricular outlet.
- **Apical Trabecular:** The defect mainly opens into the right ventricular trabeculum.

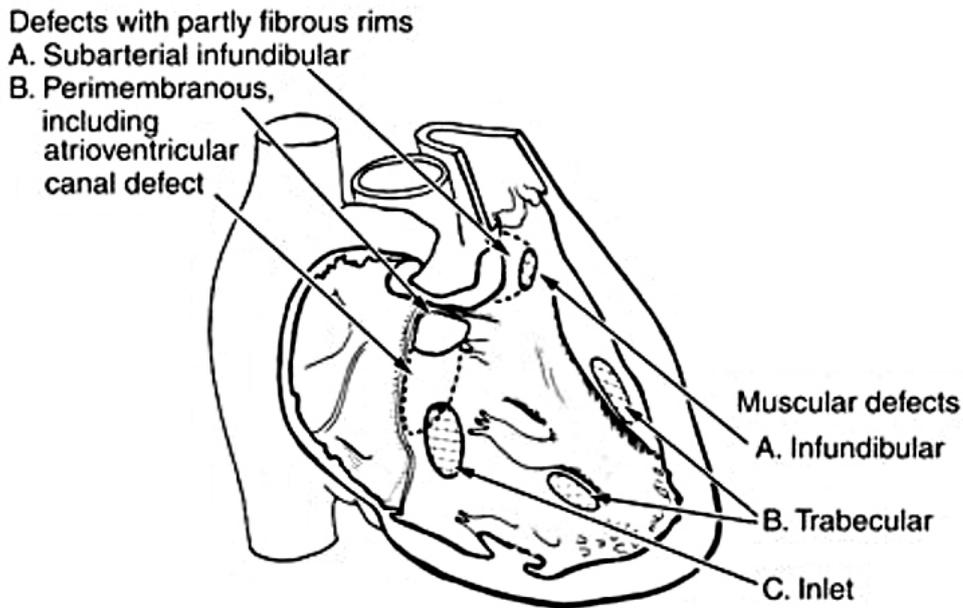
**Doubly Committed Juxtaarterial** defect is bordered by both arterial valves, and there is fibrous continuity of the leaflets of each of the arterial valves.

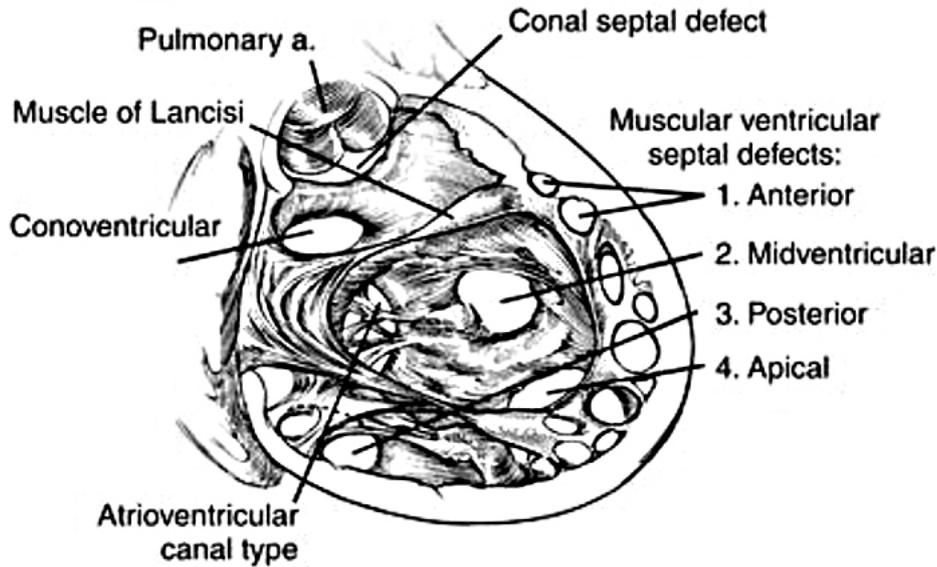
**There are 2 subtypes:**

- **With a Muscular Posterior-Inferior rim:** Extends to the muscular septum, which separates the aortic valve from the tricuspid valve.
- **With Perimembranous Extension:** Extends to the membranous septum, so that there is no separation between the aortic and tricuspid valves.



The anatomy of the ventricular septum from the right and the left ventricular aspect.





The anatomic localisation of the ventricular septal defects.

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### Disclosure and conflicts of interest:

The authors declare no conflict of interest.

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