THE APICAL IMPULSE: CLINICAL EVALUATION AND SIGNIFICANCE

Prepared by **Dr. Sidhartha Mullapudi**, DrNB (Cardiology), MD (General Medicine)
Last reviewed: October 2026

I DEFINITION AND PHYSIOLOGY

- **Definition:** The **Apical Impulse** is the lowest and most lateral point where the cardiac impulse can be palpated. It is produced by the "recoil" of the heart as the **LV** contracts and the apex strikes the chest wall.
- **Normal Location:** Found in the fifth intercostal space, roughly 1 cm medial to the mid-clavicular line.
- **Size:** Normally occupies an area less than 2 cm in diameter (about the size of a one-rupee coin).
- **Duration:** Normally occupies only the first third to half of systole.

II CHARACTERISTICS OF THE APICAL IMPULSE

- **Hyperdynamic (Hyperkinetic) Impulse:** - **Features:** Forceful, brisk, but brief impulse. It is displaced laterally but has a normal or only slightly increased duration.
  - **Clinical Causes:** Volume overload states such as **MR**, **AR**, **VSD**, or high-output states like anemia and thyrotoxicosis.
- **Sustained (Heaving) Impulse:** - **Features:** Forceful impulse that remains under the finger throughout the majority of systole (greater than 50 percent of the systolic interval).
  - **Clinical Causes:** Pressure overload states such as **AS**, Systemic Hypertension, or **HOCM**. It indicates significant **LV** hypertrophy.
- **Displaced Impulse:** - **Features:** Location moves lateral to the mid-clavicular line and often downward (to the sixth or seventh intercostal space).
  - **Clinical Significance:** The most sensitive bedside marker for **LV** enlargement and cardiomegaly.
- **Double (Bifid) Impulse:** - **Features:** Two distinct systolic pulsations.
  - **Clinical Causes:** Characteristic of **HOCM** (the "Triple Ripple" is seen when an **S4** is also palpable).
- **Diffuse Impulse:** - **Features:** Impulse is palpable over a large area (greater than 3 cm).
  - **Clinical Causes:** Typical of **DCM** (Dilated Cardiomyopathy) where the **LV** is thin-walled and globular.

III PALPABLE HEART SOUNDS AND ADVENTITIOUS IMPULSES

- **Palpable S4 (Presystolic Impulse):** A small outward movement felt just before the main apical thrust. Indicates decreased **LV** compliance (seen in **AS** or Hypertensive heart disease).
- **Palpable S3 (Diastolic Filling Wave):** An outward movement felt during early diastole. Correlates with rapid filling into a dilated, failing **LV**.
- **Left Parasternal Heave:** An upward movement of the lower sternum felt with the heel of the hand. Indicates **RV** hypertrophy or severe **LA** enlargement (the latter "pushes" the heart forward).
- **Ectopic Impulses:** An impulse felt above or medial to the apex. Often indicates an **LV Aneurysm** (the "bulge" occurs during systole).

IV THE DYNAMIC AUSCULTATION OVERLAP

- **Positioning:** If the impulse is not palpable in the supine position, the patient should be turned to the **Left Lateral Decubitus** position. This brings the apex closer to the chest wall but will normally shift the location laterally by 2 to 3 cm.
- **Respiratory Variation:** A deep inspiration may "hide" the impulse due to lung inflation, while expiration makes it more prominent.

V THE INDIAN CLINICAL CONTEXT

- **The "Silent" Apex:** In many Indian patients with **COPD** (secondary to smoking or biomass fuel exposure), the apical impulse may be impalpable due to hyperinflated lungs (emphysema). In these cases, the "Epigastric Pulsation" becomes the primary site for evaluating the cardiac impulse.
- **Rheumatic Mitral Stenosis:** A "Tapping" apical impulse is a classic finding. It is not an outward thrust but represents the palpable, loud **S1** (Mitral closure) in a patient where the actual apex is not enlarged or hyperdynamic.
- **Dextrocardia:** Given the high volume of congenital screenings in India, if the impulse is not found on the left, it is mandatory to palpate the right side of the chest before concluding it is "absent."