

Pulse

In medicine, a person's **pulse** is the arterial palpation of a heartbeat.^[1] It can be felt in any place that allows for an artery to be compressed against a bone, such as at the neck (carotid artery), at the wrist (radial artery), behind the knee (popliteal artery), on the inside of the elbow (brachial artery), and near the ankle joint (posterior tibial artery). The pulse rate can also be measured by measuring the heart beat directly (auscultation), usually using a stethoscope.

Physiology

The pulse is a decidedly low tech/high yield and antiquated term still useful at the bedside in an age of computational analysis of cardiac performance. Claudius Galen (129AD?) was perhaps the first physiologist to describe the pulse. The pulse is an expedient tactile method of determination of systolic blood pressure to a trained observer. Diastolic blood pressure is non-palpable and unobservable, occurring between heartbeats.

Pressure waves generated by cardiac systole move the artery walls, which are pliable and compliant. These properties form enough to create a palpable pressure wave.

The heart rate can be (much) higher than the pulse rate depending upon the cause or etiology. In this case, the heart rate is determined by auscultation of the heart apex, in which case it is not the pulse. The *pulse deficit* (difference between heart beats and pulsations at the periphery) is determined by simultaneous palpation at the radial artery and auscultation at the heart apex.

Pulse velocity, pulse deficits and much more physiologic data is readily and simplistically visualized by the use of one or more arterial catheters connected to a transducer and oscilloscope. This invasive technique has been commonly used in intensive care since the 1970s.

The rate of the pulse is observed and measured by tactile or visual means on the outside of an artery and is recorded as beats per minute or BPM.

Ranges

A normal pulse rate for a healthy adult, while resting, can range from 60 to 100 beats per minute (BPM) which means that your heart is slowed down because you aren't doing an activity that is getting your heart rate up, although well-conditioned athletes may have a healthy pulse rate much lower than 60 BPM, say 30-45 BPM. Bradycardia occurs when the pulse rate is below 60 per minute but is only usually symptomatic when below 50BPM, whereas tachycardia occurs when the rate is above 100 BPM. During sleep, the pulse can drop to as low as 40 BPM; during strenuous exercise, it can rise as high as 150–200 BPM. Generally, pulse rates are higher in infants and young children. The resting heart rate for an infant is usually close to an adult's pulse rate during strenuous exercise (average 110 BPM for an infant).

Evaluation

A collapsing pulse is a sign of hyperdynamic circulation.

Several pulse patterns can be of clinical significance. These include:

- Pulsus alternans
- Pulsus bigeminus
- Pulsus bisferiens
- Pulsus tardus et parvus
- Pulsus paradoxus

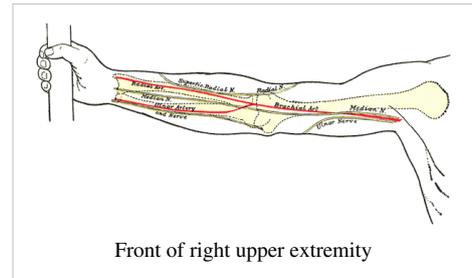
The strength of the pulse can also be reported.^{[2] [3]}

- 0 = Absent
- 1 = Barely palpable
- 2 = Easily palpable
- 3 = Full
- 4 = Aneurysmal or Bounding pulse

Common pulse sites

Upper limb

- **Axillary pulse:** located inferiorly of the lateral wall of the axilla
- **Brachial pulse:** located on the inside of the upper arm near the elbow, frequently used in place of carotid pulse in infants (brachial artery)
- **Radial pulse:** located on the lateral of the wrist (radial artery). It can also be found in the anatomical snuff box.
- **Ulnar pulse:** located on the medial of the wrist (ulnar artery).



Lower limb

- **Femoral pulse:** located in the thigh, halfway between the pubic symphysis and anterior superior iliac spine (femoral artery).
- **Popliteal pulse:** Above the knee in the popliteal space, found by holding the bent knee. The patient bends the knee at approximately 124°, and the physician holds it in both hands to find the popliteal artery in the pit behind the knee (Popliteal artery).
- **Dorsalis pedis pulse:** located on top of the foot (dorsalis pedis artery).
- **Tibialis posterior pulse:** located on the medial side of the ankle around medial malleolus (posterior tibial artery).

Head/neck

Article Sources and Contributors

Pulse *Source:* <http://en.wikipedia.org/w/index.php?oldid=359293997> *Contributors:* 2D, Aalizaraf, AbstractEpiphany, Adashiel, Aiko, Alant, AlexeiSeptimus, Alison.philp, Andre Engels, AndreasJS, Angela, Animum, Ansh666, Antandrus, Apollo, Appleseed, Arcadian, Asyndeton, Aznjoeyluc, B Fizz, Ben Ben, Bigmantonyd, Bobo192, Clreland, CYD, Cameron168, CanadianLinuxUser, CapitalR, Cartoonmaster, CesarB, Charlybrown12, Chrihern, CliffC, Crazycomputers, Daggerstab, DanielCD, David.elliott.williams, Debbe, Delldot, Discospinster, Dlohcierekim, Docu, DoppioM, Dristi, EarthPerson, Edgar181, Ekko, Eleassar, Eleassar777, Ellbeecee, Epbr123, Esanchez7587, Ewulp, Fabrício Kury, Ffaarr, Fredrik, FreplySpang, Fribbler, Garzo, Gfha, Ginsengbomb, Goldom, Greudin, H-ko, Hadal, Haisook, Halocandle, Hdt83, Hyacinth, Indeed123, Inferno, Lord of Penguins, Iridescent, J.delanoy, JForget, JakeVortex, Jamesooders, Jeffrey Mall, Jfdwolff, Jinlye, Jmundo, Joeyaa, Jorge wentzle, Kablammo, Katalaveno, Katieh5584, Keenan Pepper, Keilana, Kerotan, Khaighle, Kidq26, Kimccoy, Knewt, Lbeben, LeilaniLad, Lemmio, LiHelpa, LinkinPark, Lycurgus, Macadct1984, Martarius, Matticus78, Mazeau, Meisfunny, Mendaliv, Michbich, Minesweeper, Ndkartik, NellieBly, Nephron, Night Gyr, Nil Einne, O.Duke, Oliver202, Olivier, OmegaWiki, Oxymoron83, Pb30, Pharaoh of the Wizards, Philip Trueman, Pico7777, Pinethicket, Pmcem, Poulsen, Pri101, Quasiradiant, RDBrown, REX, RainbowOfLight, RedHillian, Rholton, Rigadoun, SAW2855, Sandahl, Saros136, Scapler, Sebo.PL, Shadow1, Shenme, Silverfireshadow, Simishag, SimonP, SpaceFlight89, St.daniel, Stanislaw Avogadro, Stephenb, Stevenj, Stillnotelf, Superdix, Superoxidismutasa, TUF-KAT, Tarkaan, Temporaluser, ThreeTrees, Thumperward, Tide rolls, Tintin1107, TomGreen, Tomskm, Topgunner, Triplesix666mafia, Tured01089, Ultraexactzz, Valiantis, Varnav, Vectorsoliton, WayKurat, Wayward, WeißNix, WereSpielChequers, Yankees76, Yinchongding, Ysangkok, Zhang He, 402 anonymous edits

Image Sources, Licenses and Contributors

Image:Gray1235.png *Source:* <http://en.wikipedia.org/w/index.php?title=File:Gray1235.png> *License:* unknown *Contributors:* Arcadian, EDUCA33E, Fred the Oyster, Magnus Manske, מִיטָא

Image:Gray513.png *Source:* <http://en.wikipedia.org/w/index.php?title=File:Gray513.png> *License:* unknown *Contributors:* Henry Gray

License

Creative Commons Attribution-Share Alike 3.0 Unported
<http://creativecommons.org/licenses/by-sa/3.0/>