Prostate MRI Anatomy
with some pearls & pointers

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MRI Anatomy of the Prostate

The best anatomic detail is on small FOV T2WI. Below an example of a prostate with minimal BPH (<30 mL entire gland). From superior to inferior, the gland is commonly divided into 3 levels (approximate thirds):

- Base (includes parts of peripheral zone, central zone and transition zone)
- Mid Gland (includes mostly peripheral and transition zones)
- Apex (includes mostly peripheral zone, some transition zone)
Normal Zonal Anatomy

Images show same prostate as prior, with 3 histologic zones and the anterior fibromuscular stroma, color referenced to biopsy charts:

- Anterior fibromuscular stroma (AS)
- Transition Zone (TZ)
- Central Zone (CZ)
- Peripheral Zone (PZ)

* From PI-RADS pg. 33
Highlight: Normal Central Zone

This is a different subject with development of benign prostatic hyperplasia in the TZ. A common pitfall on interpretation of T2WI is mistaking the central zone (CZ) for cancerous tissue. The CZ is always relatively T2 hypointense and appreciable in most cases. With BPH present in the TZ, the CZ generally thins at the posterior margin of the TZ in the mid gland and gets pushed into two fairly symmetrical T2 hypointense lobes at the base.
Normal Anatomy – Other Structures

- Prostate margin or true capsule
- Urethra
- Seminal Vesicles
- Vas Deferens
- Pseudocapsule or surgical capsule
- At the TZ/PZ interface (note with BPH also, prior image set)
- Ejaculatory Ducts
Normal T2WI Anatomy - Pearls

• Anterior fibromuscular stroma contains no glandular tissue
  • T2 dark – contiguous with bladder neck.

• Transition Zone contains 5% of the glandular tissue
  • 20-25% of cancers arise here and are more challenging to diagnose.
  • Normal appearance in older men with more BPH is “organized chaos,” mixed stromal and glandular hyperplastic elements, with individual nodules frequently having an encapsulated appearance.

• Central Zone contains 20% of glandular tissue
  • Cancers are rare and more challenging to diagnose.
  • Normal T2 dark

• Peripheral Zone contains 70-80% of glandular tissue
  • 70-75% of cancers arise here and are easier to diagnose.
  • Normal T2 light/high SI

• Normal volume is less than 30 mL – BPH causes increase in volume and rise in serum PSA.
Prostate Hyperplasia

- Benign prostate hyperplasia (BPH) typically arises in the transition zone, distorts zonal anatomy, and can get very large (over 200 mL).
- BPH has **glandular components** (T2 light) as well as **stromal components** (T2 dark), usually with multiple encapsulated appearing nodules.

BPH less commonly occurs outside of the transition zone.
- Small BPH nodule at R base at the central/peripheral zone border

BPH commonly extends into the urinary bladder (UB), frequently referred to as the “median lobe,” worth mentioning as there can be treatment implications.
Useful References


