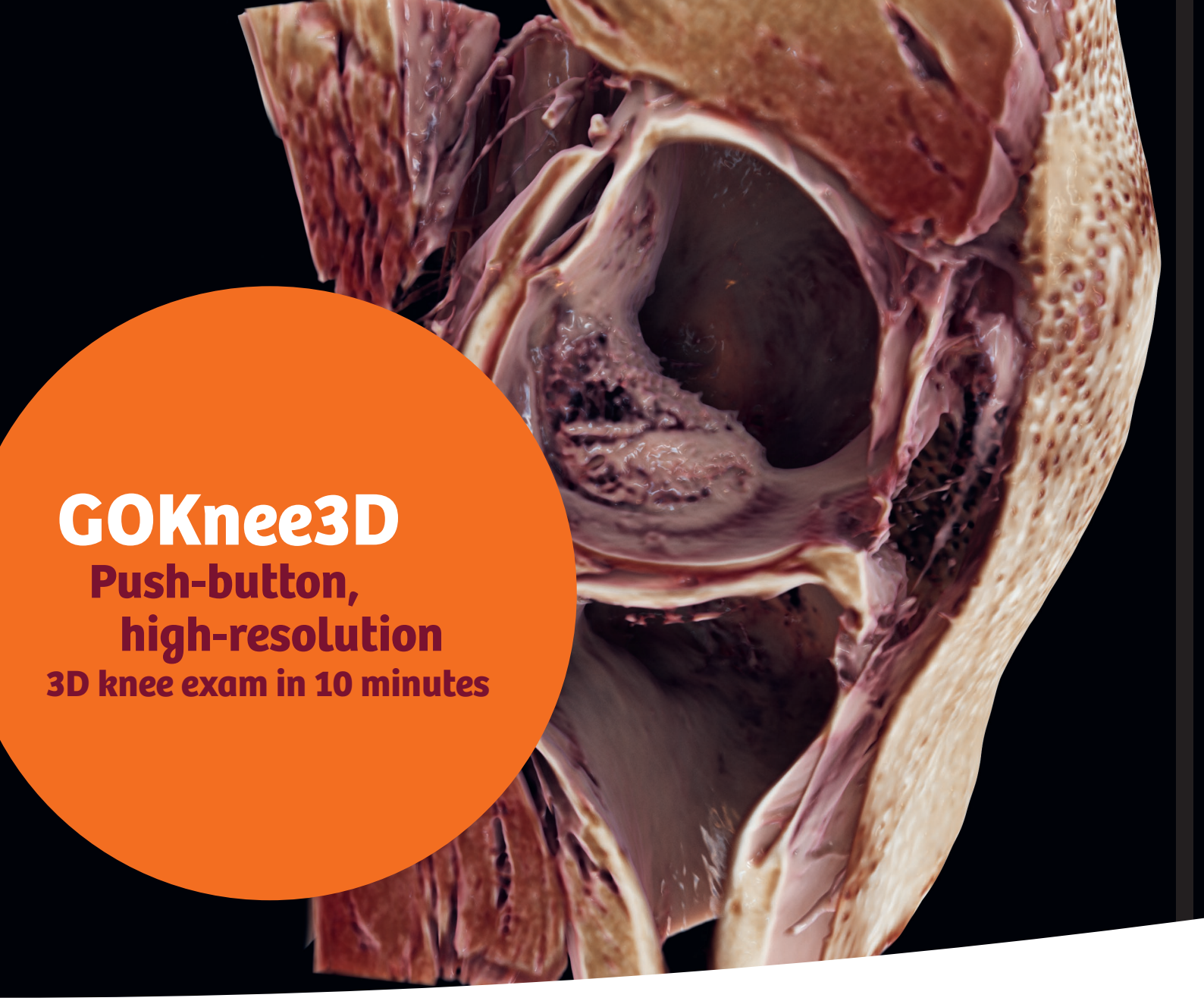

GOKnee3D

Push-button, high-resolution

3D knee exam in 10 minutes

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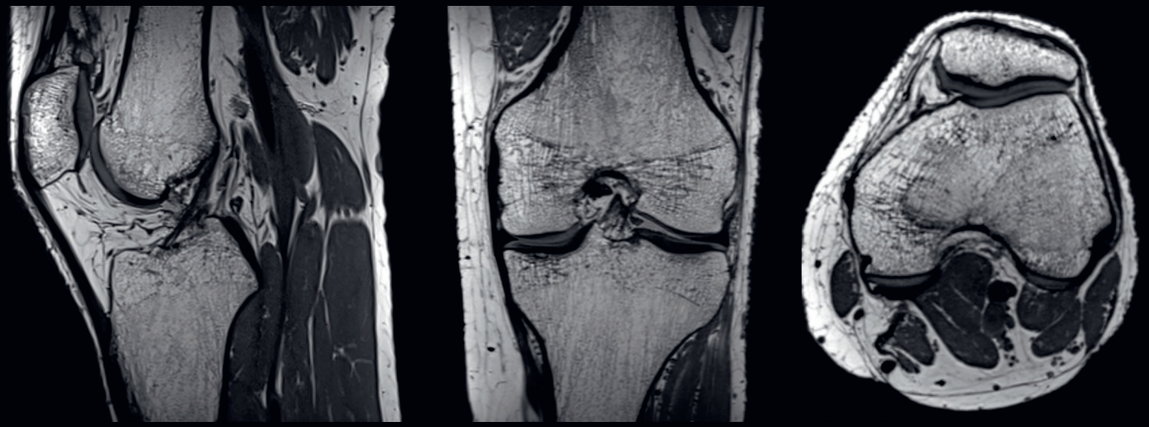
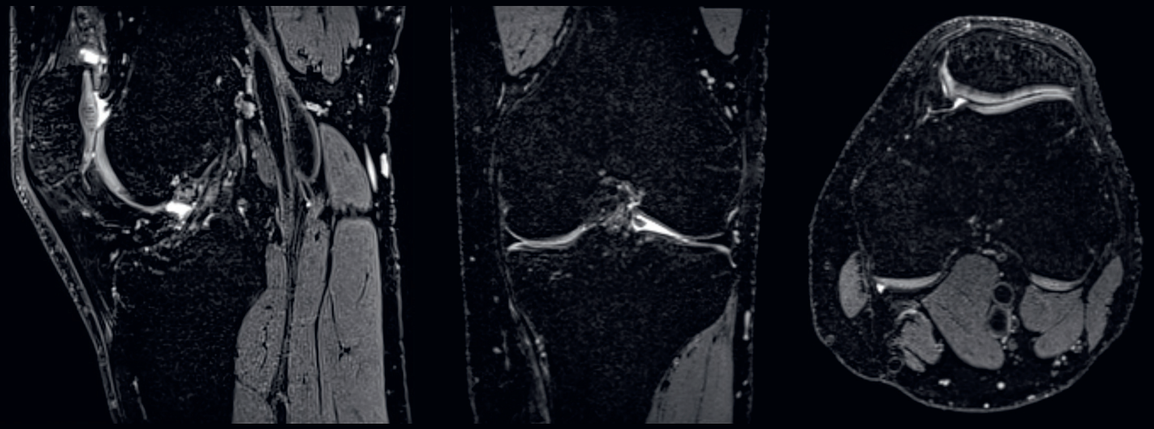
Transforming care delivery with GOKnee3D

Intermediate/PD-weighted, 0.5 mm iso, TA 4:41 min[1]



Intermediate/T2-weighted FS, 0.6 mm iso, TA 4:45 min[1]



Push-button, high-resolution 3D knee exam in 10 minutes

Clinically validated, high-resolution, isotropic 3D knee exam in 10 minutes[1]

- Equivalent diagnostic performance relative to conventional, longer 2D knee exams[2,3,4]
- CAIPIRINHA SPACE with acceleration in two directions for fast 3D imaging with high SNR[5,6]

All essential clinical contrasts with image reading in all planes

- Essential contrasts for diagnostic knee imaging; intermediate/PD-weighted and intermediate/T2-weighted with fat saturation
- High-resolution isotropic imaging allows reading in virtually any plane

Improve patient throughput and reduce costs per scan

- Push-button exam with Large Joint Dot Engine reduces scan time
- High consistency in imaging reduces the need for rescans
- Ability to reconstruct in all planes eliminates the need to acquire 2D thin slices in specific planes

"GOKnee3D enables a comprehensive evaluation of internal derangement of the knee. The fully-automated CAIPIRINHA SPACE protocol provides high-quality MRI in 10 minutes and ensures consistency of image quality and operational efficiency. The high-spatial resolution isotropic data sets help to visualize abnormalities with high accuracy, support reformations of virtually any imaging plane, and the creation of high-quality 3D rendered MR images."[7]

Jan Fritz, MD
The Johns Hopkins University School of Medicine, Baltimore, USA

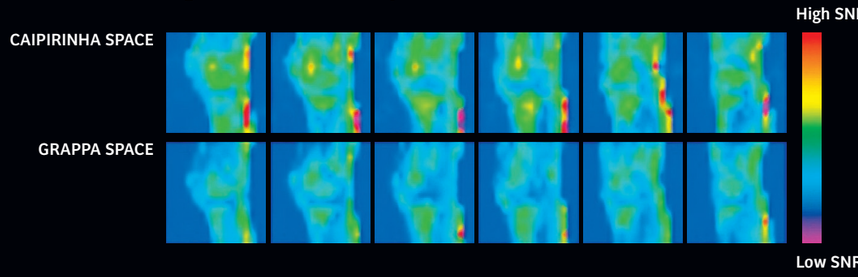
"High-resolution 3D isotropic MR imaging allows reformation of imaging data in many different ways. Oblique and curved planar MR images are useful to better visualize menisci and ligaments, highlight subtle abnormalities, and correlate well with surgical findings. 3D rendered MR images can precisely support surgical planning."

Rushyuan J. Lee, MD
The Johns Hopkins University School of Medicine, Baltimore, USA

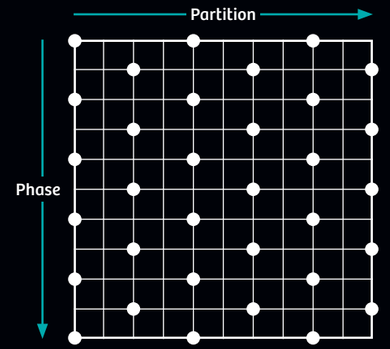
What is CAIPIRINHA?

CAIPIRINHA (Controlled Aliasing In Parallel Imaging Results IN Higher Acceleration) for SPACE allows fast 3D imaging with high SNR. CAIPIRINHA is an innovative parallel imaging acquisition technique that enables high acceleration in image acquisition while minimizing SNR loss through modification of aliasing conditions in a well-defined manner.[5,6]

Signal-to-Noise Ratio Maps



CAIPIRINHA SPACE facilitates optimized use of coil sensitivity profile information, which results in improved parallel imaging reconstruction, reduced aliasing artifacts and noise to provide more MR signal than GRAPPA-accelerated 3D SPACE.[8]



k-space sampling with CAIPIRINHA SPACE. The unique CAIPIRINHA sampling pattern enables higher acceleration factors with minimized g-factor related SNR loss.

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GOKnee3D

Push-button, high-resolution 3D knee exam in 10 minutes

- Clinically validated, high-resolution 3D isotropic knee exam in **10 minutes**[1]
- All essential clinical contrasts with image reading in all planes
- Improve patient throughput and reduce costs per scan

Case 1

Clinical background

30-year-old man with pain, swelling and instability of the right knee following an American football injury.

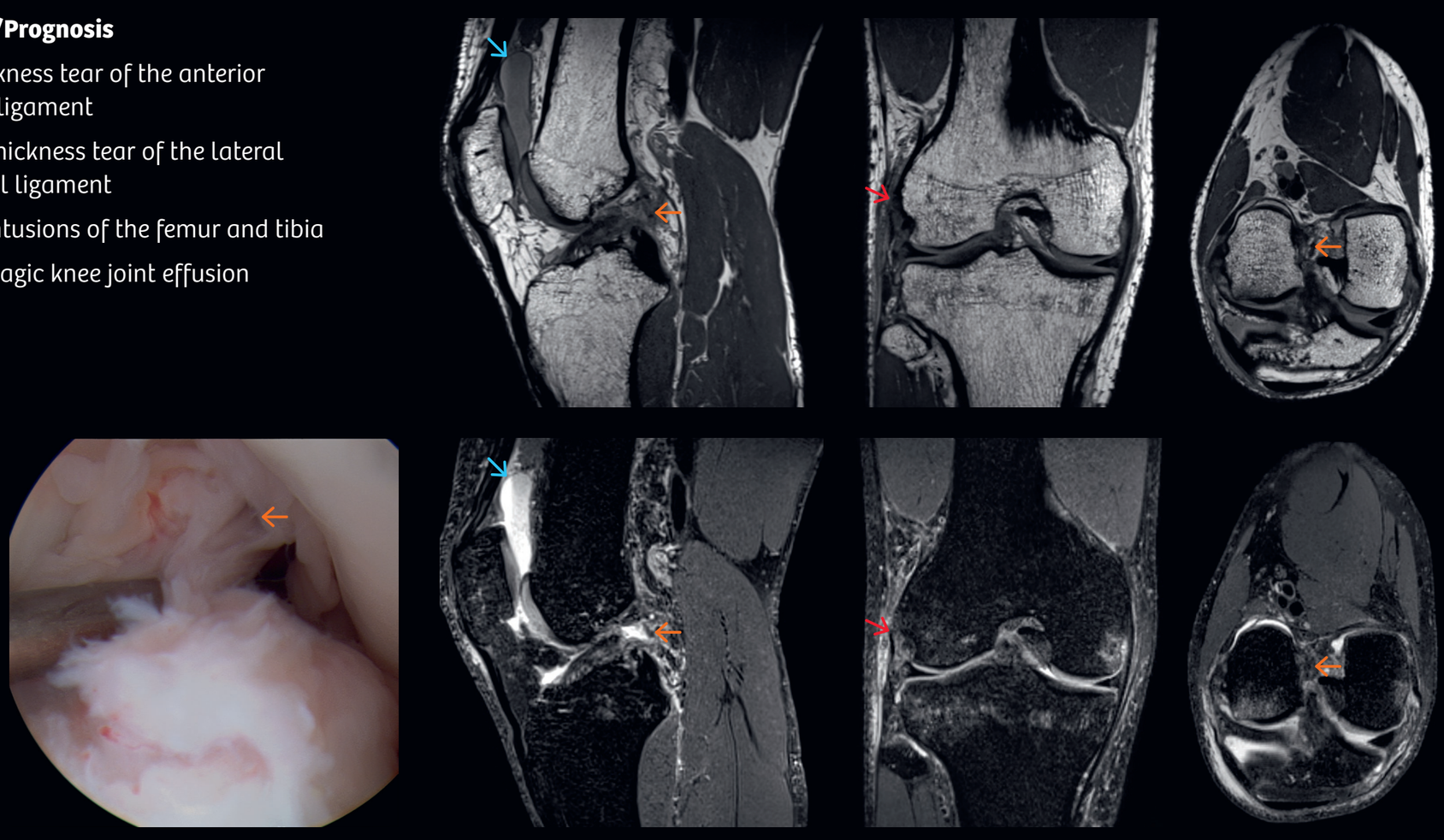
Findings

GOKnee3D images and arthroscopic photograph demonstrate:

- Full-thickness discontiunity of anterior cruciate ligament near femoral attachment (orange arrows)
- Joint effusion with fluid-fluid level due to sedimentation of blood products (blue arrows)
- Partial thickness tear of lateral collateral origin (red arrows)
- Bone contusions of femur and tibia

Diagnosis/Prognosis

- Full-thickness tear of the anterior cruciate ligament
- Partial-thickness tear of the lateral collateral ligament
- Bone contusions of the femur and tibia
- Hemorrhagic knee joint effusion



Case 2

Clinical background

14-year-old boy with mild knee pain in rest, reaching moderate to severe intensity with physical activity.

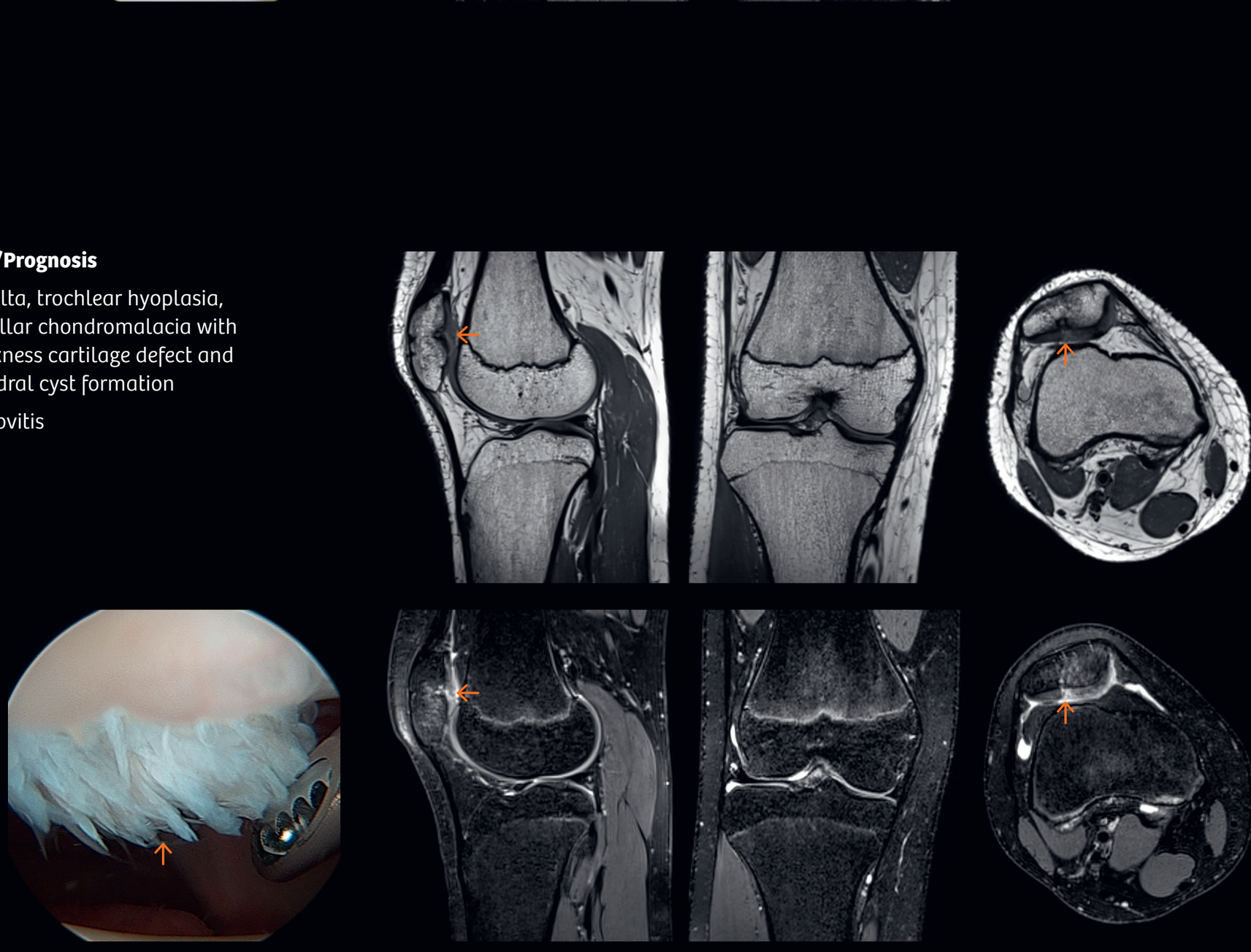
Findings

GOKnee3D images and arthroscopic photograph demonstrate:

- Patella alta alignment
- Hypoplasia of the trochlea
- Full-thickness cartilage defect (orange arrow) of the central patella with subchondral cyst formation and bone marrow edema
- Intact lateral and medial meniscus
- Intact collateral and cruciate ligaments

Diagnosis/Prognosis

- Patella alta, trochlear hyoplasia, and patellar chondromalacia with full-thickness cartilage defect and subchondral cyst formation
- Mild synovitis



[1] *Achieved on a MAGNETOM Skyra with Tx/Rx Knee 15. Total examination time will vary with system field strength with up to 11 minutes on MAGNETOM Aera.*

1. Achieved on a MAGNETOM Skyra with Tx/Rx Knee 15. Total examination time will vary with system field strength with up to 11 minutes on MAGNETOM Aera.
2. Fritz J, et al. Three-dimensional CAIPIRINHA SPACE TSE for 5-minute high-resolution MRI of the knee. Invest Radiol 2016; 51: 609-617.
3. Gaurav K, et al. High resolution isotropic 3D CAIPIRINHA SPACE MRI of the musculoskeletal system. MAGNETOM Flash 2016; 66: 30-38.
4. Del Grande F and Fritz J. GOKnee3D study. Unpublished data.
5. Breuer F et al. Controlled aliasing in volumetric parallel imaging (2D CAIPIRINHA). Magn Reson Med 2006 55(3), 549-556.
6. Breuer F et al. CAIPIRINHA revisted. MAGNETOM Flash 2015; 63: 8-15.
7. The statements by Siemens Healthineers' customers described herein are based on results that were achieved in the customer's unique setting. Since there is no "typical" hospital and many variables exist (e.g., hospital size, case mix, level of IT adoption) there can be no guarantee that other customers will achieve the same results. This statement is from a person, who or whose institution is engaged in a collaboration with Siemens Healthineers.
8. Kumar N et al. Whole volume high-resolution in-vivo signal-to-noise ratios, g-factor and g-factor similarity index superiority of CAIPIRINHA SPACE and Compressed Sensing SPACE over GRAPPA SPACE for MRI of the knee. 2017; Manuscript submitted for publication.

510(k) pending.

The cinematic rendered images are rendered with a Siemens Healthineers internal cinematic rendering prototype device.

All patient images and case descriptions are courtesy of Jan Fritz, MD, Derek F Papp, MD, and Rushyuan J Lee, MD, The Johns Hopkins University School of Medicine, Baltimore, MD, USA.

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